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ABSTRACT

This program, included in "Effective Reading Programs...," serves 1,286 black children, K-2, in six elementary schools. The three-year developmental program uses a systems approach to teaching reading. An organizational chart, the Informational Processing Model, developed by the staff over a period of four years, details the processes by which a child acquires a language system. The information on this chart provides the structure for instructional strategies which focus on the development of gross and fine motor, visual and auditory perceptual, and cognitive language skills. Using an array of sequenced publishers' materials, all the children pursue prescribed activities that develop these skills. Reading and language skills are taught with the Distar reading and language programs. Second graders also spend 50 minutes a day working in the High Intensity Learning System (HILS) center. The HILS is a classroom management system which correlates more than 40 self-pacing, self-correcting reading materials and allows one teacher and one aide to supervise 30 individual reading curriculums at a time. (WR)

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FINAL REPORT AND HANDBOOK

TITLE III - 306 PROJECT

SEPTEMBER 1971 To JUNE 1974

AN APPLIED PROGRAM TO DEVELOP

A SYSTEMS APPROACH TO THE LEARNING AND READING PROBLEMS

OF URBAN CHILDREN

Board of Education
Office of the Superintendent of Schools
Federal Assistance Programs
Newark, New Jersey
Title III - Section 306
Special Programs and Projects

Organized and Directed by:
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Newark Board of Education

CS 001 879

This document represents a summation of five years of sustained effort in the development of an applied curriculum model, based upon an empirical design using a systems science approach to elementary education. This document represents the input and efforts of many people. The level of development and the successful outcomes could never have been attained without their dedication and assistance. However, the conclusions, remarks, and recommendations contained in this report, while containing the flavor and ingredients provided by many of the Project staff, teachers, para-professionals, parents, administrators, and community, are the sole and final responsibility of the Project Director.

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PREFACE

In order to exact economies imposed by budgetary contraints, this document has been organized to serve several purposes. Rather than publishing a final report and a separate Project handbook, we have attempted to incorporate within this document all the major features of both these instruments.

The information and data which forms the body of the final report also acts as the conceptual model and data base for the Project Handbook. Again, because of cost factors, there are other reports and products which are not included in this document but are available in mimeograph form for those who are interested. For the additional reports and working papers contact the Project Director.

To those who take time from their busy lives to read this document, please be aware that the entire curriculum model, as proposed here, is less than half completed. Further, we do not see this model as an Rx or panacea for the educational problems of urban children. However, we do have data, both from this project and a previous Title VI program, as well as from data in the current educational literature, which strongly suggests that a "systems approach" is an excellent overall cumulative strategy for organizing, delivering services to and evaluating what goes on in a classroom. It is our intention, in using a systems approach, to develop information and direction about the curriculum, based on an empirical approach.

This approach emphasizes the importance of documenting instructional issues and examining them empirically. Such an approach leads logically to criterion-referenced testing, concept of skills mastery, and to organizational strategies which emphasizes experimentation and revision based on data, information, behavior analysis and observational techniques. We take the position that curriculum development is an open-ended process of continual trial and improvement, and should emphasize formative evaluation. Those who take the more traditional artistic approach tend to think of it in terms of writing curriculums with clear

beginnings and ends and think of evaluation mainly in the summative sense. From the empirical viewpoint an ideal curriculum gives unequivocal directions as to how to make learning events happen in a classroom. These events, however, are to be developed from experimentation, observation, control of the conditions of learning and the application of educational technology in a systematic fashion. In this document, the written curriculum turns out to be a report of procedures that have actually been tried out. This approach implies close initial cooperation between developers and teachers in a laboratory-classroom setting. Also, the curriculum is developed in a very large sense upon the needs and styles of the learner, as well as upon what the developers know from research: that the child needs to learn, if he is expected to succeed in school and in the highly technological society in which he is expected to adjust when he leaves school.

TITLE III - 306

PROGRAM ABSTRACT

Design an applied diagnostic - prescriptive educational system for the learning and educational difficulties of urban elementary pupils with an emphasis on a systems approach and models. Establish an early screening evaluation profile for each pupil, to enable school personnel to predict the "basic skills" needs of "high risk" pupils in the areas of learning and reading at the kindergarten and first grade levels. To shift the basic concepts of all school related personnel, who deal with children, from a "pathology model" to a "success model". Design and implement educational models and strategies which will enable the majority of children with educational difficulties to remain in a regular classroom. Establish and apply a differential diagnostic - prescriptive curriculum using a systems approach and an Information Processing Model as a basis for a readiness for learning system. Design the entire program around a classroom management system based upon a diagnostic prescriptive approach, management by objectives, formative testing procedures, task analysis, learning heirarchies, and mastery learning and process evaluation, within a feedback model, as a basis for improving pupil outcomes and changing the curriculum. This also includes the use of educational packages which have been empirically tested, use of time-space in new ways, and the organization of teachers, para-professionals and ancillary personnel in more effective configurations necessary to improve the learning and reading process. All of the preceding processes and procedures should, whenever possible, be based on data, controlled observation, research and current knowledge.

INTRODUCTION

The cost of inadequate education is staggering. For each child released into the world of work, without adequate preparation, the cost to society is almost unmeasurable. A recent study was conducted by a Senate Committee under the direction of Dr. Henry M. Levin of Standord University. Some of the more pertinent findings from this study are summarized:

- The failure to attain a minimum of a high school education among the population of males 25 - 34 years of age in 1969 was estimated to cost the nation 237 billion dollars in income over the life time of these men.
- Seventy-one billion dollars in foregone government revenues, of which about 47 billion would have been added to the Federal Treasury and 24 billion to the coffer of State and local governments.

In contrast, the probable cost of having provided a minimum of high school completion for this group of men was estimated to be about $40 billion.

- Thus, the sacrifice in national income from inadequate education among 25 - 34 year old males was about $200 billion greater than the investment to alleviate this condition.
- Each dollar of social investment for this purpose would have generated about $6 of national income over the lifetime of this group of men. The government revenues generated by this investment would have exceeded government expenditures by over $30 billion.
- Welfare expenditures attributable to inadequate education are estimated to be about $3 billion each year and are probably increasing as time passes.

The preceding data suggests the urgent need for successful programs, which have been adequately designed to meet the specific needs of whatever population of children the project may be designed to help. We are suggesting that money alone will not solve the educational problems of urban education. Only through the combination of scientifically designed programs, which are adequately funded over five to eight years, can any real change be obtained from the government funds which are spent on such endeavors by the U.S. Office of Education.

The Title III - 306 - Program guidelines, as outlined below, are organized to develop adequate and effective programs. The Newark Title III - 306 - Program is based on these basic guidelines:

Focus of Program

- Title III - 306 - Project funds are made available to special innovative research and exemplary projects which hold promise of making substantial contributions to the solution of critical educational problems.
- Grants are given by the U.S. Office of Education to programs designed to deal with broad classifications of disadvantaged students. Special priority is given to reading programs with adequate research design, as mandated in the Title III - 306 - Project guidelines.
- The U.S. Office of Education also requires that all selected and approved projects adhere to specific policies and requirements. Significant among these requirements is accountability, which means that the grantee must render an accounting of his performance.

In order to assure an adequate program design, the U.S. Office of Education insists that the following key structures be built into each project.

Evaluation Design

- O. E. mandates, with no exception, that each project have an adequate evaluation design to assure a high level of performance and efficiency of all project components. The three major components around which all programs are designed are: Management, Process, and Product.
- A key to all evaluation is the statement of performance objectives. O. E. mandates that performance objectives be precise statements of anticipated project goals, in terms of behavior, outcomes or material items.
- To assure the accountability process as stated above, O. E. also mandates and requires the contracting of an independent evaluator, approved by O. E.
- O. E. also mandates the contracting of an independent educational accomplishment auditor is to conduct an external review by a person not directly involved in the planning or operation of the project. The audit process provides an added measure of objectivity for the conclusion reached through the evaluation process.

The report that follows is based upon the growth, development and results of the Title III - 306 - Program, title "A Program to Improve the Informational Processing of Children with Learning Disabilities". The report is organized around the basic concepts as outlined in the Title III guidelines of management, process and product. We have found that using this triad clarifies and simplifies the complexities involved in program development and in explaining how the project functions.

In addition, we are including here the results of a recent nationwide study conducted by the American Institute of Research, in which they highlighted eight unique components which serve to distinguish successful from unsuccessful compensatory education programs in the United States. We are including these eight components of successful programs so that readers of this report might have a criterion against which to measure some of the overall design factors and results of the Title III - 306 - Project described in this report. These eight components are:

- Academic objectives clearly stated and/or careful planning.
- Teacher training in the methods of the program.
- Early educational intervention.
- Small group or individualized instruction.
- Directly relevant instruction.
- Structured environments.
- High intensity treatment.
- Active parental involvement.

STATEMENT OF THE PROBLEM

In general, urban children are more dependent upon the school in learing to read, write and do arithmetic than are middle class children. This does not mean that there are no middle class children in urban schools. What we are saying is that more than sixty percent of all kindergarten children entering most urban schools are significantly below their more advantaged middle class peers in those basic skills required for school success and survival, and therefore these skills must be taught, not assumed.

At the present time, urban schools use the same mediocre materials, methods and techniques that are used in the traditional middle class school programs. The more advantaged pupil succeeds in these traditional programs because of his built-in skills, teacher expectation and his programmed need to succeed, not because of the materials, methods or techniques that are used. If we insist on the continued use of less adequate methods, techniques and materials, as used in traditional programs, we are contributing to the urban child's failure process. Further, it has been much easier to blame the pathology of the child, his home environment or his life style, than it is to change learning environments, methods, materials, administrative processes or attitudes.

Another major part of the problem is that there is no systematic way for obtaining information about the educational process. We really do not know why or how children fail!

There are no organized delivery systems for improving the educational process or for obtaining a feedback loop for the continued improvement of this process. We never really define the problem because of its complexity.

We know far more than we are able to apply. There is no way, under the present system, to deal with the inertia and resistance to change. There is also no way

to adequately define the problem because of the stereo-typed explanations currently offered for why children fail in urban schools.

The entire bureaucratic system is part of the failure syndrome, as it now exists. If we are to begin to move towards a more efficient system, we must look within the present system for the solutions. This may seem paradoxical, but it isn't. Systems have a life of their own; and if we are to help children in urban educational systems, we must improve all the systems which support the educational process, as well as develop more efficient systems for the individual classroom.

We have outlined some of the more complex aspects of the educational problems as they are related to urban education. The next sections of this report make some direct and specific suggestions about the vehicles which might be developed to improve the educational intervention process in order to reduce the failure syndrome to a more manageable level in urban schools.

THE POPULATION AND LEARNING ENVIRONMENT OF THE PROGRAM

The setting for this Project is within the largest urban school district in New Jersey. The school population, at present, numbers 78,492. The population breakdown is:

Black	56,736
Indian	21
Oriental	116
Spanish	11,981
Caucasian	9,638

The community consists of low socio-economic groups of Blacks, Puerto-Ricans and working class Caucasians, mostly of Italian heritage. The city has been in a severe state of social, economic and political change. However, the situation is now showing definite signs of a reversal process through urban renewal and political directions, which are more positive and goal directed. The School Board is attempting to upgrade the educational system; the State Task Force of Higher Education has the new Medical College well on its way. There is less turmoil and more goal direction in the community in general, because all the city services are being responsive to the specific needs of the population.

Program Facilities

The Title III - 306 - Program is conducted in four central city schools.

Avon Avenue School
18th Avenue School
14th Avenue School
Harriet Tubman School

Within each school there are the following number of classrooms:

Schools	Classrooms
Avon Avenue	6
18th Avenue	5
14th Avenue	4
Harriet Tubman	5
Total	20

The Title III - 306 - Project Office was located in the 18th Avenue School, 229 18th Avenue, Newark, New Jersey 07108. Telephone Number (201) 824-2160.

In each school the Project teachers utilize all available out-of-classroom space which we can get permission to use from each building principal. By the utilization of utility rooms, auditorium stages, recreation rooms and other small rooms, we have been able to add effective team-teaching approaches and to obtain small group instruction by the systematic utilization of time and space.

We have demonstrated that by creative use of space in every building we can break the lock-step and large group instruction. By a more efficient use of building space and time scheduling we can also increase the intensity of the learning process. These are two of the major variables in successful educational intervention with children with educational difficulties.

The following is a specific description of the environment of each school associated with the Title III - 306 - Project:

18th Avenue School

The population is composed entirely of low socio-economic Black children who come, primarily, from a nearby government housing development, most units of which are of the high rise type. The school, while old, is in good condition. It

was recently renovated and space is adequate. The Project Administrative staff is housed in this school because it has the space.

Avon Avenue School

An excellent school, with all the necessary space. The Program is accepted and we receive total administrative support. The principal is a change agent in his own right. He is well accepted by both the community and the teachers. The entire staff associated with the Project generally supports the Project because of the administrative leadership. The children in this school are also all Black. However, about sixty percent come from upper-mobile families who are middle class in orientation. Also, the lower socio-economic families are somewhat higher in income levels than those associated with federal housing environments. There is active community input in this building. The leadership in this community has influenced educational policy city wide. They seem to support the Project and have been a big help in its success in this building.

Harriet Tubman School

It is one of the oldest schools in the City of Newark. There is inadequate space, over-crowding and all the other evils and inefficiencies associated with inadequate school buildings found in the urban centers. The Administration has changed three times in less than two years. The school is community controlled, in the strictest sense of the definition. The population is eighty-five percent Black and fifteen percent Puerto Rican. The entire population is low socio-economic with many families below or at the poverty line. The staff is predominantly Black and the principal is also Black. The current principal seems receptive to change but is conservative in judgment because of his newness to the position. The previous principals both were very supportive of the Project. The staff and teachers, with

a few exceptions, are also very supportive and actively engaged in the Project. The community has also been very supportive to both the concepts of the Project and the nature of change being introduced. This school has also institutionalized the change as the Project moved to the next higher grade.

14th Avenue School

An older building with inadequate facilities, but with good space arrangements relative to the Project's system concepts and use of space in new ways. This population also consists of about eighty-five percent Black children and fifteen percent Puerto Rican children. The children come from two and three-family homes. The population tends to be upper mobile and the parents have a middle class attitude towards education. Much of the judgment about the programs and change is made at the recommendation of the principal and school staff. This building has provided an ideal environment to inaugurate change. The principal is actively involved as a change agent within the Project design. The communication is open and feedback is excellent. There is resistance by some of the Project teachers, but their behavior has been changed because of School Administration acceptance and a desire to utilize the Project design for curriculum change for pre-school, kindergarten and first grade, and the use of the systems approach to learning at the higher levels in the school.

Each of the Title III - 306 - Project Schools have on the average one-hundred-and-fifty pupils per school. The Project originated in the kindergarten year and proceeds longitudinally with the same population of children through the first and second grade levels. Now children entering the Project at the first and second grade levels are pretested at each level and post-tested at the end of the first and second grade years. Children who entered either the first or second grade

level after December 1 of each school year were not included in the statistical data, but they all received the curriculum treatment at whatever point they entered the program.

It should also be noted that we have leveled into the longitudinal design an additional evaluation design, which affords valuable comparison among treatment groups. Starting in kindergarten, there were 497 children who entered kindergarten and who were pre and post-tested. At the beginning of first grade, there were 175 newly admitted children in the first grades in the four schools who had not received treatment in the kindergarten. This affords us an excellent comparison between "K" and "No K" children. We have the same conditions prevailing at the second grade level but with less new pupils entering at this level.

The analysis of the statistical data on all measurements used among the populations is presented as follows:

- Pupils with three years of treatment
- Pupils with two years of treatment
- Pupils with one year of treatment.

There are several analyses and statistical treatments of the data comparing the effects of the programatic intervention among and between groups. Summaries of these results will be found in advanced sections of the report.

PROGRAM OBJECTIVES

Management Objectives

- Utilize a systems concept based on system science knowledge to effectively utilize the Informational Processing Model (Appendix A) as the basic construct and management tool for organizing management, process and product objectives.
- Design and implement a learning readiness classroom management system.
- Establish a system of early screening and evaluation profile to enable us to predict the "high risk" learning and reading disabled children at the kindergarten and first grade levels.
- From the screening and evaluation process establish individual diagnostic assessment profiles for each child.
- From the diagnostic assessment profiles delineate the precise definition of the learning problems and patterns of the population of the children involved.
- From the data and information provided by the individual diagnostic profiles design the educational prescriptions and interventions to ameliorate and/or reduce learning failure.
- Attempt to shift the concept of the present classification system held by educators and ancillary personnel from that of a "pathology model" to one based on a "success model".
- Design educational classroom strategies which will enable the majority of children with educational process problems to remain in the regular classroom.

- Design and evolve a differential prescriptive interventional curriculum for the learning readiness system based on the educational disabilities patterns of the children in the program. (See Appendix A - Model and Materials List.)

- Establish a sequential and structured linkage between the "learning readiness system" - Informational Processing Model and a "reading system", i.e., High Intensity Learning System-Reading by Dr. S. Alan Cohen. (See Appendix B.)

- Put into operation four (4) High Intensity Learning Systems-Reading developed by Dr. S. Alan Cohen and the Random House System Division. This is a system designed around 500 instructional objectives intended to systematically teach reading.

- Organize an evaluation design, with the assistance of an independent outside evaluator, which will be used as a major tool for the evaluation of the entire Project, i.e., management, process and product outcomes.

- Hire an independent educational accomplishment auditor whose major function is to audit and verify the results of the evaluation procedures. The audit is designed to add objectivity to the conclusions reached in the evaluation process.

- Organize a systematic use of statistical models based on data which will be computer analyzed and used as a major management tool for project improvement and change. (See evaluator's final reports for each project year, which are available under separate cover.)

Process Objectives

- Design and implement a learning and reading readiness classroom management system using the Informational Process Model as the basic construct for matching learners' needs based on the assessment data, with the therapeutic materials organized around educational strategies which are based on the best current synthesized knowledge available on how children learn.
- Develop a readiness for learning and reading curriculum based on task analysis of those skills which have been shown empirically to be critically related to school learning and the reading needs of the Project population.
- Design and implement a diagnostic-prescriptive curriculum which will teach "readiness for learning" and school survival skills.
- Design and implement a classroom management system.
- Organize both time and space in creative and efficient ways in order to:
    - Intensify learning
    - Assure small group instruction
    - Mandate scheduling of sequential elements of program instructional components
    - Utilize any available space outside of the classroom for instructional purposes in order to assure that small group instruction is possible.
- Utilize a "team teaching" concept within the Informational Processing Model design, in order to maximize language and psychomotor development. To meet these objectives it will require the utilization of:
    - Developmental Language Teachers
    - Developmental Psychomotor Therapists

- Develop within the learning and reading readiness curriculum a systematic use of special learning packages and materials organized around the Informational Processing Model, which current theory and research suggests will assist children to learn basic readiness for learning and reading skills.
- Develop and organize a well equipped material and media system within each classroom.
- Organize an efficient media system of cassettes, listening centers and headsets and cost effective "soft ware" student materials for each classroom.
- Organize and write instructional objectives for all areas of the Informational Processing Model and code all materials to these IO's within each area of the taxonomy. (Visual-Motor Perceptual Handbook completed and available from the Project Director.)

MANAGEMENT

General Program Management

The program is organized and directed by a program administrator and three professional staff members. The staff consists of two school psychologists who function as educational psychologists and whose concerns are mainly directed to educational process considerations such as process assessment, designing and testing criterion evaluation instruments, and writing instructional objectives for various parts of the program. Also, assigned to the staff is a reading specialist who is also engaged in process evaluation, teacher training and consultation, and designing of process audit instruments used to evaluate the effectiveness of the Distar Reading Program in the classroom. There is also a Project clerk-secretary whose function is most critical. She acts not only as a secretary, but as a statistical clerk. She organizes the voluminous test data accumulated as a major part of the Project design. Her role is a critical and important part of the Project management system.

The major management functions are:

- Designing and organizing a diagnostic-prescriptive readiness for learning and reading curriculum for pre-school to the third grade.
- Utilize and perfect from program data a Systems Approach as the major management tool, using the Informational Processing Model (of Section II-Process) as the foundation for the diagnostic curriculum.
- Within the systems concept and the Informational Processing Model, we organize time, space, special materials and personnel to meet the stated objectives of the Project.
- To systematically order all the special supplies, materials and equipment required to implement the program. Order all equipment at the most economical prices and with the highest quality and which suits the stated specifications of the Project.

- To maintain adequate records and books to account for Project funds.
- To develop and organize all reports requested by the U.S. Office of Education.
- To publish an interim and final report of the Project findings, conclusions and recommendations.
- Disseminate, as widely as possible, the findings, successful techniques, processes and management systems developed within the Project Model.

PROCESS

STRATEGIES FOR EFFECTIVE LEARNING IN A SYSTEMS DESIGN

A System Science Approach

- Within the environs of elementary education there is a crucial need to apply new knowledge, techniques and system science models. One of our major management goals and objectives is to design a delivery vehicle which uses a "systems approach". The concept of a system in this program has two parallel uses:
  - Applied systems science
  - Systems used as technology.

A System is Defined

- As the totality of elements in interaction with each other.
- As a type of structure which functions in the form of definite sequences of operations.
- As the structure or organization of an orderly whole clearly showing the interrelations of the parts to each other and to the whole itself.

The essence of all these definitions is the coupling among the components and the systems organization resulting from such coupling.

Applied Systems Science

Applied systems science deals with the study of "organized complexities". The educational process in urban school systems is just such a complexity. It is critical that we learn to utilize data and information (cybernetics) for unlocking such complexities.

The application of the above concepts to human systems has resulted in the further refinement of the systems science concept by the use of a term known in system

thinking as "anasynthesis", specifically defined as the process of analysis, synthesis modeling and simulation. All of these concepts in the definition are used in the development of the Project.

The following is a specific use of the anasynthesis concept in model and system strategy building.

Anasynthesis

- First Phase (Analysis Phase)

  1. Specification of post-instructional task via task analysis.
  2. Restatement of task as behavioral objectives.
  3. Specification of a sequence for behavioral objectives; i.e., structural analysis.

- Second Phase (Synthesis Phase)

  1. Specification of instructional activities.
  2. Design of evaluative procedures.

- Third Phase (Operational Phase)

  Includes two simultaneous activities.

  1. Carrying out of instructional activities.
  2. The collection of evaluation data.

- Feedback and Redesign of System; Reiteration

  The data collected at the operation phase is fed back into the systems so that it can be tested, validated and redesigned based upon input data.

Systems Used as Technology

Because there is a broad general misconception among many professionals, both within and outside of education, relating to the use of the term technology, a recent definition was developed by a group of economists at the Brookings Institute who defined technology in this way:

"Technological knowledge is a set of techniques, each defined as a set of action and decision rules guiding their sequential outcomes under certain specific circumstances." Educational technology in this program is a major key to educational process intervention. It can be understood as meaning the development of a set of systematic techniques and accompanying practical knowledge for designing, testing and operating schools as educational systems. Technology, in this sense, is educational engineering. It may or may not involve hardware. Sometimes it does, frequently it does not. It involves changes in "software". The goal then of educational technology is to define those procedures and techniques which, if followed, will lead to the attainment of various educational objectives. It also defines the environment in which those educational objectives may be achieved.

"In simple terms, a systems approach means doing something intelligently, efficiently, and humanely." From the standpoint of this program, "designing a curriculum is an engineering problem which involves three steps".*

1. Defining the goals clearly and operationally, eliminating all ambiguities.
2. Defining the know-how; listing what knowledge and information basic research gives us in order to reach specific goals.
3. Defining the resources available to apply this know-how in order to reach those goals. Engineering effective curriculum requires that we define realistically the human, physical and fiscal resources available.

The basis of the readiness for learning curriculum is an Informational Processing Model. This model has all the aspects of a systems approach referred to above. The model describes and helps us to understand the complex process of decoding required by the human organism if it is to adapt in a school environment.

Instructional System in Reading

The Informational Processing Model is linked at the second grade level to the High Intensity Learning System - Reading (HILS) designed and developed by

* Dr. S. Alan Cohen - Effects of a Curriculum Design Based on a Systems Model

Dr. S. Alan Cohen. This system is a classroom management technique organized around 500 instructional objectives. These objectives are the operational definitions of reading in the High Intensity Learning System.

The above technology and concepts from applied systems science are the foundation stones for all the management procedures, techniques and methods used in this program. These concepts also are the basis of the classroom and curriculum management systems organized and devised in this Project.

Description and Use of the Information Processing Model and the High Intensity Learning Systems - Reading

The Information Processing Model is used to undergird the entire change process in this Project. From our standpoint, a model is seen to be less pretentious than a theory and implies a somewhat shorter life span. Yet, a model exhibits all the logical empirical characteristics of a theory.

A model is used to:

- Describe and help us understand complex systems.
- Help us see relationships.
- Provide the framework for experimentation.
- Indicate areas in which experimentation is not possible.
- Assist in engineering design.

The Information Processing Model is also used as the basis of the diagnostic-instructional process in the classroom. The Information Processing Model relies heavily on cybernetics, communication theory, neuropsychology and neurophysiology. The Information Processing Model is a synthesis of the works of Osgood, Wepman, Kirk, Myklebust, Clements, Pribram, Piaget, Bruner, et al.

The model is an open ended system designed to explain human learning and development. Its main purpose is to organize and facilitate, in a systematic way, the development of diagnostic instructional systems for use in the mainstream of elementary urban education. At its present stage of development, it is designed

to generate an instructional system for children from pre-school through the fourth grade. The Informational Processing Model (Appendix A) is a Micro-System (total system); the various components of instruction are the Micro-System (sub-systems) used in the diagnostic instructional process in the classroom.

Readiness is defined: Readiness for learning implies that there are certain conditions that precede the learning-event-itself and they operate to determine the probability of its occurence.

We see the Information Processing Model as a readiness-for-learning process model, designed to teach each child those decoding skills which are crucial to survive in school. Those decoding skills which seem most crucial to the conditions which precede formal school-presented learning tasks are:

- Attention
- Gross and Fine Motor Process: Tactile-Kinesthetic
- Visual Perception
- Auditory Perception
- Auditory Language Analysis
- Cognitive Skills: Short-term Visual and Auditory Memory; Verbal Reasoning and Strategy Building via Language Symbolic Formations

Within the systems technology used within the model we organized:

- Teachers
- Para-Professionals
- Mastery Learning Strategies
- Instructional Objectives
- Special Materials and Learning Packages
- Time Space

- Scheduling of Inputs
- Use of building space outside of the classroom
- Room dividers
- Classroom floor plans

- Small Group Learning based on functional level of students in the Distar Reading System
- Intensity of Learning induced by:
  - Time Scheduling
  - Sequencing of Learning Packages
  - Tight structuring of time, space, materials and personnel
  - Criterion and Process Evaluation based on an evaluation design
- Student progress records on basic skills development
- Process "mastery checks" used as formative test of basic skills learning for all areas of the Information Processing Model
- Management evaluation check list
- Management decisions from data
- Problem Solving Process
  - Teacher Workshop
  - Distar Training Sessions
  - Daily noontime meetings conducted on a systematic schedule over entire school year

The Information Processing Model - Readiness for Learning is systematically linked with the High Intensity Learning System - Reading designed by Dr. S. Alan Cohen. The High Intensity Learning System is a classroom management system built around six features:

- Prescriptive - Teacher defines student's unique needs and prescribes activities to meet those needs.
- Motivating - Pupils get immediate feedback to his responses.
- Individualized - A variety of materials are used that are designed specifically to assist the teacher in personalizing content, rate and level for each student.
- Intensified - Its objective is accountability for each student and teacher.
    - Both know what must be learned.
    - Both know methods and materials to use.
    - Both know what must be done to show mastery.
- Definitive - The system is used in a reading center where High Intensity Learning maximizes the amount of "reading period" time the student spends on appropriate learning activities.
- An "Open System" - The system is continuously being reviewed and improved. It is not partial to any single program or publisher.

This instructional system is designed to increase actual clock time spent by each pupil per class hour in participating in the prescribed learning activity. Research reports that the average teacher receives only 30 - 40 percent of the pupil's attention, fixed on the learning task, per class hour. That same research reports the obvious: The single most important variable that best predicts reading achievement is the actual amount of time the pupil spends learning to read and write. The more time he spends, all other factors being equal, the higher will be the achievement.

HOW IS THE INFORMATION PROCESSING MODEL USED TO DESIGN A CURRICULUM IN THE PROJECT?

The Information Processing Model is used as a taxonomy for organizing a diagnostic-prescriptive instructional process based upon mastery of basic skills within a "systems approach" to classroom management. (See Appendix A)

These constructs are used as the basic strategy for organizing the foundation for the instructional design in the Project.

WHAT IS THE PURPOSE OF USING A TAXONOMY?

A taxonomy is an analytic tool that helps match special learning materials, learning packages and special management and teaching techniques with diagnosed skills and behavior deficits of pupils, individually or with small groups of pupils with similar diagnostic patterns. This Project is now organized to diagnose the basic skill needs of all children assigned to the Project. The taxonomy also provides information and levels of criteria for assessing the pupil's learning style and how he interacts with a learning system.

In phase one of the Project process intervention, the taxonomy also provides the teacher with specific pedagogical sub-systems of learning materials, organized from simple to complex. We are now in the second evolving phase of organizing specific instructional objectives for each separate sub-system within the taxonomy or model.

To make the taxonomy or each sub-system within the model operative at the instructional level, we have organized large amounts of special materials, learning packages and media in a systems approach which delivers these materials to meet the diagnostic learning needs of small groups of children with similar skills deficits. We have continued to add needed materials and learning packages to the materials center as they are made available nationally or brought to our attention by consultants, people from other programs or from the literature and from the sales representatives who visit us periodically. There are also several curriculum material banks now available in the United States under the direction of the Office of Education. (See Appendix A for an up-to-date list of materials used at the various levels of the program.)

WHAT ARE THE BASIC CONCEPTS WHICH UNDERGIRD THE CURRICULUM DESIGN IN THIS PROGRAM WHICH SET IT APART FROM THE TRADITIONAL EDUCATION CURRICULUM DESIGN AND THE EARLY CHILDHOOD PROGRAMS PRESENTLY BEING USED IN THE NEWARK SCHOOL SYSTEM?

The Title III - 306 - Program is designed to meet the specific diagnostic needs of children, based upon the empirical data obtained from an organized psycho-educational evaluation of all children entering pre-school or kindergarten programs. These same assessment instruments are used to evaluate the effects of the curriculum intervention strategies which are designed around the Information Processing Model and provide a series of specific taxonomies of treatment which are described further on in this section of the report. Evaluation and assessment are never used to label pupils. The main objective of the assessments is to determine the basic skills level of all incoming pupils in those areas of skills development so critical for survival in school. It is also imperative that all children learn these skills before the more formal curriculum is imposed. At the present time a course of study is required and imposed on the vast majority of Newark children before they have mastered the critical readiness for learning skills that are emphasized in this program. Furthermore, each group of pupils in a traditional program is expected to acquire, in ten months time, all the necessary skills that will permit them to succeed in first grade. There is little or no recognition of the level of skills development of the pupils as they enter school. It is this failure to recognize "that certain basic skills must be learned as the major conditions that precede the learning event itself and that it is the learning of these basic survival skills that increases the probability of pupils learning the information and skills necessary to succeed in traditional curriculum models". When pupils are exposed to the traditional curriculum without sufficient information and knowledge, based on data obtained from assessment of the pupil's skills development, failure is inadvertently being imposed on approximately sixty percent of kindergarten and first grade pupils under traditional courses of study. This statement is supported by the specific data from this Project and from hundreds of other studies and programs funded by the U.S. Office of Education over the last ten years.

The major point of this analysis is that all the Project data dramatically demonstrates that all entering pupils, with very few exceptions, can master the basic skills required for school survival and success in school, if we organize learning environments based upon children's diagnostic needs and if we then design

prescriptive educational interventions designed to meet these needs before imposing prescribed courses of study.

If those who establish curriculum policy in urban centers continue to ignore the data relative to the basic skills needs of urban children, a continued failure pattern will prevail in the pupils' product scores. It is time we recognize that a more complete analysis and diagnosis of the complex learning needs of urban children is urgently needed.

In addition, traditional curriculum content must be changed and organized to meet the learning styles of urban children. This statement does not imply or mean that we should not teach curriculum content that pupils will need to succeed in the mainstream of our society or to enter our best colleges or universities. However, it does mean we should stop inducing failure unwittingly by exposing children to prescribed curriculums without first teaching them the basic readiness for learning skills they require.

There are several other critical areas of difference between the curriculum design in the Title III - 306 - Project and the more traditional models currently used in urban schools. The following statements, relative to the need for a change model, are basic to the curriculum strategy used in this Project. These are the concepts of mastery learning and time. "If we are to change schooling, especially as a means of intervention for children with educational problems in poverty pockets and in urban school environments, it is essential that the model itself change! Behavior-oriented learning psychologists have been among those arguing for precise definition of models and of educational goals in behavioral terms. The clues for mastery learning was a conceptual model of school learning suggested by John B. Carroll. This model rested on observation often overlooked by traditional educators and is so ably argued by Carroll, that individual pupil achievement is the basic measure of the traditional school and where the school is committed to uniform exposure to instruction, it is inevitable that pupils with higher abilities will achieve more in the same amount of time; and when all the achievement test scores are gathered together, the distribution will approach that of a normal curve."*

* Bloom, Cohen, Merrill, Gagne, et al.

It is important that this relationship be clearly understood. If instructional time is held constant for all pupils, the outcomes are fixed; that is, the faster learners with the most highly developed skills will learn more than the slower learners during the same amount of instructional time and, consequently, the faster learners will achieve more and do better on achievement tests. It seems very unlikely that any foreseeable educational intervention or innovation will change this outcome in any substantial way as long as the instructional time is held constant.

Carroll proposes instead that the "outcome measure" should be that of "mastery learning" and that the "type of instruction" and "the time" for it should be varied accordingly to individual pupil characteristics. The outcome then would hopefully be that a majority of students would achieve a specified level of mastery; that there would be little or no correlation between aptitude and mastery measures; but time to mastery would still correlate with aptitude scores.

Our present traditional curriculums and school policies, however, are almost universally organized to give group instruction based on a uniform time schedule. This is an efficient way to run a large organization, but its very convenience in dealing with large numbers of pupils leads inevitably to the measurement of individual pupil achievement under conditions of standard exposure to instruction. It is critical that this relationship between measurement of educational outcomes and the organization of the school be kept in mind. No matter what ideal system of schooling is invented, if it relies upon standard time for instruction, it seems inevitable that the outcome measure is going to be pupil achievement distributed along a normal curve which will be positively correlated with the pupils' rate of learning as measured on some aptitude test. As long as the "instructional time" is held constant for all pupils, individual differences will increase and will be related to the pupil's score on ability tests of basic skills and cognitive processes, which predict rates of learning.

WHAT COULD CHANGE THIS PRINCIPLE, WHICH SEEMS TO DOOM SLOW LEARNERS TO A LIFE OF COMING IN LAST AND TO MAKING URBAN SCHOOL DISTRICTS APPEAR AS IF THEY ARE UNABLE TO TEACH PUPILS BASIC LITERACY SKILLS? WHAT SHOULD OUR EDUCATIONAL OBJECTIVES BE?

Instead of measuring how far each pupil runs, we could make our objective that each pupil run X yards during the course of his school experience and not care whether it took him four minutes or five days. The objective would be that each child master certain distance. This is the model of schooling that Carroll proposed. It would mean a school that was organized so that each pupil could spend different amounts of time to reach each mastery level. There are two major types of mastery learning strategies now in use. Both types attempt to better individualize instruction by:

- Helping students when and where they have learning difficulties
- Giving them sufficient time to learn
- Clearly defining what they will be expected to learn and to what level.

But one type uses primarily an individually based instructional format where each student learns independently of his classmates. (The High Intensity Learning System - Reading by Dr. S. Alan Cohen, of which there are four in operation in this Project, uses this model.)

The other employs a group based approach where each student learns cooperatively with his classmates. (This model is used in the Information Processing Model - Readiness for Learning Curriculum to be described further on in this report.)

Along with the use of the mastery model outlined above, it is important to recognize that the traditional model relies essentially on a classification model of schooling. Traditional overall educational objectives have been to select and reject large numbers of pupils for various levels of achievement within the broader educational systems. A mastery model of education on the other hand and the one advocated in the Title III - 306 - Project makes a very persuasive argument for a

different model of evaluation - one based upon mastery in specified units. A mastery model of evaluation will require:

- Specific educational objectives based on pupil's diagnosed needs.
- Various specified routes or strategies to assure the majority of pupils attain the criteria set for mastery.
- Specified sequence.
- Specified measures of competency.

If we design the learning systems and the learning environments correctly in time, a mastery model of evaluation should permit for more individualization of the routes to mastery, based upon learners' basic skills needs, learning styles and characteristics, and specific interest and values.

This educational model would require that all curriculums would have to undergo a logical analysis and evaluation, which is now sadly lacking and a basic cause of continued failure of urban pupils. The traditional model fails to meet the diagnostic educational needs of more than sixty percent of the pupils in urban schools. Let us hasten to point out, however, that there are and always will be children who do have a minimal success in traditional curriculum designs. Howeyer, even these children are not maximizing their abilities in the traditional curriculums.

BASIC CONCEPTS USED IN THE DEVELOPMENT OF THE TITLE III - 306 - CURRICULUM

The curriculum design that undergirds the Title III - 306 - Program is a system science approach which is attempting to design curriculums and learning environments and to apply educational technology and the science of learning and education based upon the empirical needs of students, based on a strong data base, observation and knowledge. The curriculum is designed upon the basic skills needs of students and organized around a systems science approach and the concept of models as a means of organizing schools and classrooms. The curriculum design which follows is not only based upon the concepts stated above, but also

encompasses additional design and evaluation features considerably different from current written curriculum techniques.

In traditional curriculums the writers are more concerned and put more emphasis on what the teacher is to perform and less emphasis on what the child is to learn. Learning outcomes are not spelled out in traditional curriculums. The primary direction here is what is arranged for the student to do. Essentially, the difference is one between the artistic vs. the empirical approach to teachings.

The empirical approach emphasizes the importance of documenting instructional issues with data and examining them empirically. Such an approach leads logically to both domain referenced - diagnostic prescriptive teaching and testing and to organizational strategies which emphasize a systematic model based on experimentation and revision. The artistic - I think and I feel approach - de-emphasizes experimentation in any form and emphasizes strategies for production and dissemination of materials that are judged to be important or exciting on subjective ground.

We, who support the empirical approach to curriculum design argue that curriculum development is an open-ended process of continual trial and improvement and emphasizes formative evaluation.

Those who take the artistic approach tend to think of curriculum as having clear beginnings and ends and think of evaluation mainly in the achievement sense. From the empirical viewpoint an ideal curriculum should give unequivocal direction as to how to make certain things happen in a classroom, given that those things are known from experimentation to lead to specified learning outcomes. The curriculum in these terms turns out to be a report of procedures that have actually been tried out. This implies, as we did in this Project, close initial cooperation between writers and teachers in a laboratory-classroom setting. Separation of the two processes creates a barrier to tryouts and evaluation of content and method as well as learner outcomes. Curriculum writers are not held accountable for the learning outcomes and teachers are not held very strictly accountable for the implementation of the curriculum, as written. Neither party ever really knows

why children succeed or fail in current traditional curriculum designs. In addition, current traditional curriculum outcomes only serve as an ad hoc judgment on what has been done. What the empirical curriculum demands is a formative evaluation which is central and dynamic rather than peripheral and static.

The following readiness curriculum for pre-school, kindergarten, first and second grades, is an open-ended empirical curriculum model based on a systems approach, using the concept of models as a basic design feature. The educational technology employed has been explained in previous sections of this report. What follows is a detailed description of the curriculum at its present level of development. At the present level of development, the curriculum and management system is only about fifty percent completed. It is currently recognized in the research and development literature that it takes five to eight years to fully perfect a curriculum, and even then there must be change if the empirical model concept is to be maintained.

Position Statement on Reading

At the present level of knowledge the answer to the question "What is reading?" leaves much to be desired.

However, there are some excellent leads for curriculum design to be found in the reading research literature completed over the past ten years. Much of this research has moved away from concerns over methods of teaching reading to areas related to:

- Language development
- Learning to read
- The role of models
- Systematic effort in model and systems development as related to instruction
- Application of convergence techniques in the solution of reading problems.

From the reading research literature we have found that there are five major models related to the process of reading and which act as the foundation for many reading systems in use today. It is these five models which are directly associated with the Informational Processing Model and the High Intensity Learning System used as the basis of the curriculum design from kindergarten through fourth grade. These models are:

- Linguistic
- Psycholinguistic
- Information Processing
- Cognitive Processes
- Perception.

The current trend among reading researchers is their attempt to unlock the complexity of the reading process by using a convergence technique among divergent models.

Some of the generalizations which emerge by using the convergence technique with the various divergent models in use today that apply to the conceptual constructs of the Information Process Model used in the Title III Program are:

- The need to reduce uncertainty:
  From birth on an organism needs to reduce uncertainty or to gain information. Reading, like any other process tends to reduce uncertainty by processing information. This is a basic motivation for learning to read.

- Internal representations:
  The organism internalizes a representation called a schema by Bartlett (1932) and Pribram (1960). This means that or organism is developing a heirarchy that controls the order in which a sequence of operations takes place.

- Early and rapid development of language:
  There is general agreement that a child's ability to use the more common grammatical patterns of speech is pretty well developed by the time he is three to three and one-half years old.

- Role of Cognition:
  It has altered or lead to a different understanding of our orthographic system, which is not a "one-sound, one symbol system" but has characteristics more in keeping with Chomsky's levels of lexical abstractions and a deep structure rule learning.

Speaking and Reading

A person's identification of words depends on "a three-way synthesis between certain sounds both that he makes and those that others make, feedback from his speech motor system and meaning". At the reading level "there is again a three-way synthesis between the spatial signs, the spoken word and meaning". Again, there is a parallel processing of input, this time visual, followed by the sequential verbal processing.

In some of the rapprochement among models in the current research that fits the Information Processing Model used as the basis of the Program curriculum is the concern of model builders with :

- Attentional processes
- Learning distinctive features of visual stimuli (matching input with a memory trace)
- Visual information storage
- Short-term memory
- Long-term memory
- Coding process
- The grammar of the language
- Production strategies.

The reading program which follows for kindergarten, first and second grades attempts to integrate some of the specific points outlined in the current reading research literature and within the curriculum materials used in the various sub-systems of the Informational Processing Model.

We are not locked or tied to any specific reading system. At the current level of curriculum development, the Distar Reading System seems to be the best organized decoding system for teaching decoding skills to children who are experiencing difficulty with school based language systems. Distar Reading seems to meet the specific empirical needs of this population of children. It also fulfills one of the basic tenets of the Information Processing Model: that "decoding or input precedes output".

However, the Distar Reading system, while meeting the decoding needs of the Project population, does not seem to develop the level of comprehension skills and levels of performance on standardized reading tests that one would expect. The reading process problem, related to comprehension, still remains to be solved. We should keep in mind that the development of comprehension is closely linked with language and cognitive skills development, as well as with levels of cognitive maturation. The solution or unlocking of this complexity will depend on our ability to understand how language is learned, how cognitive skills are developed, and how these processes interact both in enabling the pupil to learn to read and in the reading process itself.

The Title III - 306 - Reading Curriculum

Reading is initially a receptive language skill which is learned. Because reading is a language process, it is the considered position of the project staff that reading initially is a decoding process: input must precede output. To meet the instructional demands indicated by the empirically based needs demonstrated by a large percentage of urban pupils for decoding skills, and also because the entire readiness-for-learning Information Processing Curriculum is based on a decoding model, Distar I, II, III was selected as the reading program. The Distar Reading Systems I, II, III has empirically demonstrated that all children can master the integrated language skills associated with decoding.

Overview of the Distar Reading

The Distar Reading Program is designed to teach the child each skill he needs in order to read. The two consecutive levels are carefully programmed so that the child is confidently able to perform a skill before another one is introduced.

In Distar Reading I, the child is taught the basic decoding skills. He learns that the squiggles we call letters represent sounds. He learns to say the sounds and then to blend the sounds together to make a word. He also learns how to spell a word by sounds - "ooonnn" - and to say the sounds fast - "on".

The child is taught the sounds of forty lower-case symbols, which include the letters of the alphabet, certain joined letters such as sh, and the long vowels with diacritical marks. All special symbols are phased out as the child progresses through Reading II.

Distar Reading II emphasizes comprehension skills, building on the skills taught in Reading I. The child learns to read stories fluently and with understanding. The stories in Reading II are longer and more complex than in Reading I, and the student relies on his increasing word-attack skills and sight word vocabulary. He begins to answer written questions in order to demonstrate that he understands what he has read.

The child is taught to follow written directions that help him in developing a precise understanding of what he has read. He is also taught to name the capital and lower-case letters of the alphabet. At the completion of level two the child has learned solid word-attack skills and has acquired a large reading vocabulary.

At kindergarten level the class is divided into three small groups for Distar Reading. The parallel inputs conducted during this time segment in the program, along with reading, are language, gross motor learning - movigenics, and perceptual training. The pupils rotate between these processes every fifteen minutes. The teacher conducts the reading process in the classroom while the other two thirds of the pupils are out of the classroom with the language and movigenics teachers in different locations in the building or working with the paraprofessionals in the classroom.

It should be pointed out that the initial grouping of children for the Distar Reading group is done on the basis of teacher judgment. Pupils are moved between groups based upon their learning rate in the Distar System. At the end of the kindergarten year the children are grouped for first grade placement based upon the following strategy. All group I pupils, based on what lesson level they are at at the end of the kindergarten year, are placed in classes with pupils from other groups with similar functional lesson levels in the Distar Reading. This same procedure is applied to groups II and III. The first grade classes then consist of children with similar learning rates based on their mastery level in the Distar Reading System. At the first grade level we maintain a flexible placement procedure through October of the first grade year. If children have advanced in their reading behavior because of summer school work or because of maturation, they are moved between classes to assure correct placement in the Distar Reading System. These reading groups set the structure for the grouping in the balance of the program. The purpose of this procedure is to make if feasible to move pupils between reading groups without having wide lesson-level differences between reading groups in any one classroom.

For complete list of curriculum objectives for the entire Distar Reading System, see Behavioral Objectives, Distar Reading I, II, Developmental Edition 1971, Published by Science Research Associates, Incorporated. Space will not allow its reproduction here.

A Basis for Language Learning Curriculum

One of the fundamental concepts which undergird the Information Processing Model is that reading is a receptive language act. However, the language process in man is a complex system, and exactly how the graphic act of reading decodes to speech and why competence in learning and speaking must precede the reading act is not fully understood

It is also known that there is a higher order rule structure inherent in language in its phonological, morphological and syntactical aspects. As the child becomes more skilled, he will use the structural principles to organize the information of language and he will be able to read in larger, more efficient units. The major contribution to knowledge about language acquisition have come from three sources:

- Developmental psychology
- Psycholinguistics
- Information Processing

The Information Processing Model synthesizes information and data from several language acquisition models. Briefly outlined, the language model in the Title III - Program is similar to that of John Carroll's, which extracts contributions from behavioristic developmental, psycholinguistic and linguistic models of language acquisition along with the nativistic model and position of Lenneberg, Werner and Kaplan. We would hasten to say that we support the linguists' position, as posited by Chomsky and reinforced by Carroll, that a behaviorist model is simply incapable of accounting for the known facts of language development. The works of McNeil, Slobin and Lenneberg and other researchers in the psycholinguistic domain offer strong evidence which suggest that operant behaviorist models cannot explain how such complex cognitive behavior, such as reasoning, problem solving, intelligence, perception, memory, recall and thinking occur or are learned.

However, the behaviorist model for teaching language to children has been found to be useful. The operant conditioning techniques used by Berieter, Engelmann and Osborn have been used successfully in teaching pronunciation and syntax to disadvantaged pre-schoolers.

A further emphasis and support for the language model used for instruction is the evidence that language development is a function of the growth of the human brain and is relatively independent of intelligence. Further, children learn language from the age of 0 to early adolescence. If the capacity for primary language acquisition does not begin to decline until adolescence, (Lenneberg, McNeil, et al) then it is extremely important that we develop learning environments which systematically teach language structures to pupils.

Title III - 306 Distar Language Program

The Distar Language System is conducted by two full time language teachers in each of the four project schools. Pupils, at the kindergarten level, are sent to the language teacher for fifteen minutes each day in small groups of about eight children to each group. The language teachers use small rooms or whatever available space can be found in each building to conduct this aspect of the program.

Language development is related to the processing of information and knowledge. In fact, reading is basically a receptive language process.

We have found that children respond both to the teacher and each other in a positive way when using the Distar Language System. The small group instruction, with children grouped on the basis of similar skills needs, using an instructional system that is organized in sequential steps and around a behavior modification model, has real impact on pupils.

Children also benefit from the moving out of the "squarebox" of the traditional classroom under their own direction. They also benefit from the interaction with several adults instead of being faced with one teacher for the entire schoolday. The entire language process is designed to meet the needs of pupils at the level of their development and to advance them as rapidly as they can learn. The system also is designed to teach the cognitive reasoning skills at the higher levels of the program. This process will be described in the first and second grade curriculum in the next sections of this report.

The Kindergarten First and Second Grade Language/Cognitive Curriculum

The basis for the language instruction at the kindergarten level is the Distar Language System developed by Sigfried Englemann and distributed by SRA. This system consists of Distar Language I used with all the kindergarten pupils and Distar Language II and III designed for grades one, two, and three.

The instructional objectives of Distar I, as used at the kindergarten level, are as follows:

*Identity Statements

Curriculum Objective: To teach the pupil to identify common objectives and to make complete, affirmative and/or negative identity statements.

Behavioral Objective: When asked questions pertaining to the identity of common objects, the student can answer in complete affirmative and/or negative statements.

*Polars

Curriculum Objective: To teach the child to identify, understand, and use words that are opposites.

Behavioral Objective: When asked to identify and use descriptive adjectives and their opposites (polars), the student can formulate complete affirmative and negative statements.

*Prepositions

Curriculum Objective: To teach the child to understand and use the basic prepositions of location.

Behavioral Objective: When asked to answer questions about the location of objects, the student can answer in complete statements containing prepositions.

*Pronouns

Curriculum Objectives: To teach the child to:

1. Substitute singular and plural pronouns for nouns.
2. Identify objects described in pronoun statements.

Behavioral Objectives: When asked to:

1. Substitute pronouns for nouns, the student can make complete pronoun statements.
2. Find pictures that match statements containing pronouns, the student can select the correct picture.

*Multiple Attributes

Curriculum Objectives: To teach the child:

1. That all of the characteristics in a descriptive statement must be true of the object described for the statement to be valid.
2. To recognize more than one attribute, or characteristic, of an object and to describe an object in terms of its attributes.

Behavioral Objectives: When asked to:

1. Recognize identifying features of objects, the student can indicate whether the characteristics are true of the object and can make full statements describing the attributes of the object.
2. Determine the identity of an object, the student can figure out what the object is by asking questions about its attributes.

*Comparative-Superlatives

Curriculum Objective: To teach the child comparative and superlative concepts and to compare two or more similar objects by making complete comparative-superlative sentences.

Behavioral Objective: When asked to compare two or more objects that differ in a particular dimension, such as length, the student can produce complete comparative and superlative statements.

*Location

Curriculum Objectives:

1. To teach the child to distinguish between characteristics of a location and the location itself.
2. To teach the child to recognize characteristics that are common to a location.

Behavioral Objectives:

1. When given a location, the student can name the characteristics of that location.
2. When given the characteristics of a location, the student can identify that location.

*Same-Different

Curriculum Objective: To teach the child to use the concepts "same" and "different" and to compare and contrast characteristics of objects.

Behavioral Objective: When presented with two or more objects, the student can indicate how the objects are the same and how they are different.

*Only

Curriculum Objective: To teach the child to understand how the concept "only" limits a situation.

Behavioral Objective: When presented with pictures of situations, the student can use "only" statements to describe the pictures.

*Action Statements

Curriculum Objective: To teach the child to identify simple actions and to make complete affirmative and negative action statements.

Behavioral Objective: When asked simple questions pertaining to action and function of common objects, the student can answer in complete affirmative and negative statements.

*Categories

Curriculum Objective: To teach the child to identify and to classify them into a number of different categories by applying rules of classification whenever possible.

Behavioral Objective: When asked to identify and classify objects, the student can apply rules of classification to the objects to determine whether they fit within a given category.

*Plurals

Curriculum Objective: To teach the child to understand the difference between singular and plural statements and to make questions and statements in the singular and plural.

Behavioral Objective: When asked questions about the identity of singular and plural objects, the student can produce complete affirmative and negative statements.

*Why

Curriculum Objective: To teach the child to give causal explanations for actions.

Behavioral Objective: When shown three pictures depicting a sequence of actions, the student can identify and state reasons for the outcome of the actions and indicate the results of the sequence.

*Verbs of the Senses

Curriculum Objective: To teach the child to use sense verbs and to identify the sense organ associated with each sense verb.

Behavioral Objective: When shown pictures that can be described using "is" (The pencil is long), the student can restate the description using an appropriate sense verb (The pencil looks long) and can name the sense organ associated with the sense verb.

*Verb Tense

Curriculum Objective: To teach the child the language concepts used in describing past, present, and future actions and to make full action statements in the past, present, and future tenses.

Behavioral Objective: When asked to describe pictures, the student can make full statements of action in the past, present, and future tenses.

*If-Then

Curriculum Objective: To teach the child to understand the cause and effect structure of "if-then" statements as they apply to groups and actions.

Behavioral Objective:

1. When given "if-then" statements, the student can make deductions about objects or actions to which they refer.
2. When given conditions that pertain to specific objects, the student can make an "if-then" statement about the objects by drawing conclusions from information given.

*Before-After

Curriculum Objective: To teach the child to understand and state what happens "before" and "after" in a sequence of actions.

Behavioral Objective: When shown pictures depicting sequential action, the student can identify the action and answer "before" and "after" questions pertaining to the sequence.

*Parts

Curriculum Objectives:

1. To teach the child part-whole relationships.
2. To teach the child new vocabulary dealing with objects and their parts and to identify and give the function of objects and their parts.

Behavioral Objective: When shown an object, the student can identify it, distinguish the parts from the whole, name the object's parts, and give the function of the object and its parts.

*Or

Curriculum Objective: To teach the child to recognize that "or" can make conditions or actions expressed indefinite.

Behavioral Objective: When given an "or" statement, the student can make deductions about pictures relating to the statement by recognizing that the use of "or" makes the condition or action expressed indefinite.

*All

Curriculum Objective: To teach the child to recognize what kind of information "all" statements give and what information they do not give.

Behavioral Objective: When given an "all" statement, the student can make deductions about pictures by recognizing what kind of information "all" statements give.

* One

Curriculum Objective: To teach the child to understand the difference between "one" and "more than one" and to use criteria in a "one" statement to figure out solutions to problems.

Behavioral Objective: When given a statement indicating what will happen to "one" subject, the student can identify the candidate who will perform the action on the basis of the criteria in the "one" statement.

* Some, All, None

Curriculum Objective: To teach the child to differentiate between some, all, and none.

Behavioral Objective: When given statements and questions containing "some", "all", or "none", the student can respons by following directions or making complete "some", "all", or "none" statements.

* Colors, Pattern, Shapes

Curriculum Objective: To teach the child to identify various colors, patterns, and shapes.

Behavioral Objective: When shown pictures of objects having various colors, patterns, and shapes, the student can identify the colors, patterns, and shapes of the objects.

* Comprehension

Curriculum Objective: To teach the child to interpret and relate what is happening in a story that is read to him.

Behavioral Objective: When presented stories that reinforce language concepts and statement patterns taught in the presentation books, the student can answer comprehension questions about what is happening in the stories and what the characters say and do.

Analysis of the Pupil Population

Unfortunately the current educational view, relative to urban children's ability to learn, tends to lump all pupils in the slow learner category. The image that is subtly maintained is that the largest percentage of pupils who come to school will, at best, only partially succeed. Most educators will state that twenty percent of the children will learn whatever they are taught without much difficulty but the balance will continue to be less successful academically as they progress through school. This self fulfilling prophecy is maintained in the educational environment of the schools by several strategies which impede change or prevent sustained change from occuring. One of the major difficulties is that the current instructional environments are organized based upon prescribed curriculums which are imposed on the student by teachers, who, in most instances, decide what to teach from this curriculum based on their own educational experiences, values and feelings. It is the teacher then who decides what children should learn. There is little or no analysis of the basic skills needs of the students, no assessment of their learning skills, no systematic taxonomy of what skills they have or what skills they still must learn, if they are to succeed in school. Little, if any, consideration is given to their learning style, language system, cultural experiences or motivations to learn. The fixed curriculum, developed for middle income children, is taught or delivered based on achievement models, normative concepts or grade equivalents, which often adds to the dilemma of young urban students who attempt to learn in the pre-school, kindergarten and early primary grades. It is much simpler to shift the blame for failure to the pathology of the child, the home, the culture of poverty, economic factors or social dysfunction or whatever, than it is to develop a scientific analysis and data base of our students' needs and to create learning environments to meet these needs, in a systematic way, based on data, educational technology, knowledge and a complete analysis of the problem.

From the data obtained from the assessment and evaluation in the Title III - 306 - Project over the past three years and from the knowledge developed from the educational research literature and other U.S. Office of Education Projects over

the last ten years, it is sufficiently well documented so that we can now make the following statements, with some degree of assurance, so that a clearer picture of the educational needs of students can be defined:

- About 25 to 30 percent of the normal first grade population, after two years of treatment in the Title III Program, consists of pupils who are 1 1/2 years below their peers in those skills required to progress normally in school, as this is presently defined, in terms of achievement test grade equivalent scores, or normative data upon which the tests are based, or the child development concepts each educator carries in his head, whatever they may be.

- Thirty-five to forty percent of the normal first grade population indicate normal skills development, but with significant basic skills difficulties in following directions, auditory temporal processing, short term memory, language differences and, in many instances, a different learning style from that required by the school as now organized, i.e., mismatch between learners and learning environments. There is also significant indication of vocabulary differences between the child's out-of-school vocabulary development and the vocabulary usually expected of entering kindergarten and first grade pupils. There also seems to be a difference in the student's information base, which is not recognized by the school personnel. The child has information, but it is different from that expected by the teacher (See Robert Williams, William Labov, Shirley Baratz, Wolfram, et al). <u>This strata of students constitutes the largest single corpus of students that all current and past programs have found the most difficult to help.</u> It is this group that traditional curriculums have the most adverse effect upon. It is from this group of students with normal range potential, but with basic skills different from those required in school, that the highest incident of school drop-outs can be expected. It is also this group that produces the most dramatic reduction in reading achievement scores as they progress through the primary and secondary grade levels. If we can

find a systematic answer to the curriculum needs of this group of pupils, much of the educational problem of urban schools will be dramatically improved.

- The top 25 to 30 percent of pupils in a normal first grade have generally well-developed school-based skills. These pupils are what we term "upper mobile". They are motivated to learn. They have good paying attention skills, average vocabularies for first grade, well developed symbolic language systems; they also have average or above average information base, and many of these pupils are already reading when they arrive at school. They indicate excellent auditory temporal processing linked with average or above average short and long term memory systems, coupled with good visual and auditory language skills. However, the current educational environment often fails to meet the needs of this strata of student too. What happens to this group is that they tend to regress to the mean of their school-related peer group. They tend to underachieve, become disinterested and lose much of their earlier education momentum as they progress through school. These students also become casualties of the present educational learning environments because these environments do not meet their unique needs. What we are suggesting here is that current curriculums and learning environments seem unable to meet the critical skills needs of the majority of students entering our urban schools.

APPLIED DIAGNOSTIC - PRESCRIPTIVE CURRICULUM

THE KINDERGARTEN PROGRAM

*Diagnostic Assessment and Evaluation:

After each pupil has been in kindergarten for at least four weeks, we assess each child with the following instruments:

Given individually to each pupil by the assigned language teacher are:

* Peabody Picture Vocabulary Test
* Two Subtests from the I. T. P. A. (Experimental Model)
  - Auditory Vocal Automatic Grammar Test
  - Auditory Vocal Association Test
* Wepman Auditory Discrimination Test

Given in small groups by the classroom teacher are:

* Berry Visual Motor Integration Test
* Gates Reading Readiness Test
* Lorge Thorndike Non-Verbal Cognitive Abilities Test - Form A-Level I and II.

From this data we establish:

* An individual profile for each pupil.
* From a summation of the individual profiles we obtain "patterns of skills", in terms of strengths and weaknesses, found among the pupil population. These "pattern analyses" supply information which facilitates the decision-making process relative to the kind and nature of diagnostic curriculum intervention that is required to meet the readiness for learning skills of the pupils in the Project's population.
* This diagnostic data also enables us to organize management decisions relative to curriculum materials, time-space organization, technology and media needs, what learning packages and materials to purchase, what personnel is needed to implement the program and to budget Project funds.

* The evaluation design and product outcomes are also built around the post test data obtained from the same instruments after eight months of diagnostic instruction. (See Evaluation Design, Appendix C.)

We have also included the entire summary of the testing data from the final reports, completed by an independent evaluator at the end of each Project year, in the "conclusion" section of this report. In the section of the report titled, "Going Beyond The Data Given" you will find a summary of the Title III - 306 staff's findings regarding the implications of the data, its value for curriculum development and implications for administrative policy, decisions and judgments.

In the next part of this section, a detailed outline of the concepts used to structure the learning environment and kindergarten curriculum is presented.

Time - Space Orientation

Space: Each room is organized to make the most efficient arrangement to accommodate the movement of children, in and out of the room, every fifteen minutes at kindergarten level and every 30 minutes at the first and second grade levels. This arrangement enables the teacher-aide to work with small groups of children using the special materials of the program, while the teacher engages a third of the class in reading. We also establish an Auditory Perceptual Listening Center and a Distar Reading Center, which is separated by three to five room dividers used to cut down distracting visual stimuli and to fit room space to the cognitive needs of the children. Outside of the room we use any small space suited to accommodate from five to twelve children, who are serviced by a full time Distar Language teacher and a Movigenics teacher. We also use parts of recreation rooms, small classrooms or auditorium stage space for the Movigenics teacher (physical movement education). By organizing classroom and other available building space not normally used every day, we are able to break up the "square box" - one room-syndrome. Organizing time-space dimensions enables children to move, in an orderly fashion, in and out of the classroom and to be educationally treated in small groups by para-professionals.

Time: Linked with the organization of space, we also organize time into curriculum modules of fifteen minute (15 minute) segments for the kindergarten curriculum and half hour (30 minute) segments for first and second grade children. The purpose of the time scheduling is to intensify, sequentialize and structure the teaching process to assure the maximum input in each school day. By time scheduling, we are also able to get more learning out of each day. Further, the current literature indicates that the major impact on learning is obtained by the intensity and sequencing of instruction. High intensity produces the highest rate of learning among the variables related in instruction. (Appendix - Project Time Schedule.)

In summary, time-space organization becomes a technology for organizing the conditions of learning. This is a critical variable that is not sufficiently attended to in traditional programs. There is a considerable amount of teaching time lost each day under the more traditional approaches. By utilizing space outside of the classroom, we are able to obtain small group instruction with the assistance of team teaching and para-professionals. Through these procedures, we have changed learning environments for young elementary school children. We have broadened the world of school from one room - one teacher, to three rooms and four different adult personalities each day. By these arrangements of time and space we have intensified, structured and sequentialized learning which is a basic mix required in the environment of the elementary school.

The curriculum intervention is based on the assessed decoding needs of the Project's population in six areas of Human Information Processing. These are:

* Gross Motor Development
* Fine Motor and Tactile - Kinesthetic Development
* Visual Perception
* Auditory Perception
* Language - Communication - Reading
* Cognitive Learning Skills

All the above learning channels are programmed in parallel to improve decoding of all automatic processing skills. It is basic to all higher order learning that the

automatic-temporal processing skills be well developed if pupils are to survive in school. Input must precede output.

Further, it is emphatically stated that there is no linear relationship between the above taxonomy of psycholinguistic skills and reading. However, if children are inefficient, or do not possess these skills when they enter school, and if the school learning environment only haphazardly teaches these basic skills, about sixty percent of the children will be delayed in the cognitive learning and reading development. The frustration and failure of this large body of children who find information processing difficult, in spite of normal potential, causes them to become the school failures, behavior disorders and school dropouts at the higher grade levels.

It is imperative that we develop a diagnostic-prescriptive intervention curriculum which is based on the skills needs of children. This project and the following curriculum design is devoted to this goal.

Kindergarten Curriculum:

Gross Motor Development: via a Modified - Barsch - Movigenics Program

This area of the Project model is based on the movigenics curriculum developed by Dr. Ray H. Barsch in the following two source documents:

* Achieving Perceptual Motor Efficiency, Volume #1 by Ray H. Barsch
* Enriching Perception and Cognition Techniques for Teachers, Volume #2 by Ray H. Barsch. Both published by Special Child Publications, 4535 Union Bay North East, Seattle, Washington 98105.

Dr. Barsch defines - "Movigenics as the study of the origin and development of movement patterns leading to learning efficiency".

There are twelve dimensions pertaining to human learning which constitute the basic curriculum in this area of human information processing.

All children in kindergarten receive instruction instruction in the twelve areas of the movigenics curriculum. For 15 minutes, on alternate days, this section of the project is conducted by two physical education teachers assigned to the program.

These two teachers service over five hundred children each week in the implementation of the movigenics curriculum.

The twelve dimensions of the movigenics curriculum are:

* Muscular Strength
* Dynamic Balance
* Spatial Awareness
* Body Awareness
* Visual Dynamics
* Auditory Dynamics
* Kinesthesia
* Tactual Dynamic
* Bilaterality
* Rhythm
* Flexibility
* Motor Planning

Additional task orientation and theoretical thinking for the movigenics curriculum is also integrated into the program from the works of Newell Kephart - The Slow Learner in the Classroom and Gerald N. Getman - How to Develop Your Child's Intelligence. There is also other source information which the teachers have applied in the expansion of the movigenics curriculum. See Appendix.

Perceptual-Motor Learning: Fine Motor System

The curriculum intervention in this area of the model is conducted by the paraprofessional assigned to each kindergarten. In each classroom the pupils are divided into three groups, based on teacher judgment, assessment instruments and reading development in the Distar Systems.

The curriculum used in this area of the taxonomy or sub-system is based on a manual for the development of visual motor perception developed by the Title III Staff. Within the manual there is arranged a series of twenty-five (25) instructional objectives, organized around the five areas of visual perception developed by Dr. Marion Frostig. These areas are:

* Visual Motor
* Figure-Ground
* Perceptual-Constancy
* Position in Space
* Space Relationships

In order to place each child in this sub-system, the para-professional administers the Marion Frostig Developmental Test of Visual Perception. The test is modified to provide entry into the sub-system. We do not score the test to obtain a score. We use the Frostig test as entry procedure to place the child in the Frostig Program at the level of his competencies. When each child's level of entry has been determined, each pupil is then given a pre-post criterion evaluation. The pre-post criterion test consists of giving the pupil the last exercise in a series of exercises in the Frostig Program. Example: Frostig: Visual Motor Coordination Exercises, 1 - 29.

Pretest: Exercise 29 - last exercise in series; scoring: Pass/Fail

If the pupil passes the pretest (exercise 29), he advances to the next pretest, the last exercise in the next higher series of exercises in Visual Motor Coordination. If the student fails the pretest, he begins on the first exercise of the series and continues to the end of the series. In this example, if he failed exercise 29 (the pretest), he would enter the system and be required to do all exercises from 1 to 29 under the Visual Motor Coordination sub-curriculum.

Post Test: When he has completed all exercises 1 - 29, he is given exercise 29 again; if he fails exercise 29 again, but passes 70 percent of all exercises between 1 - 29, he is permitted to go on. If he obtains a criterion of less than 70 percent, he should be recycled using the supplementary materials listed under each instructional objective. When he has completed the additional programming, based on the supplementary materials, he is re-evaluated at the discretion of the teacher and the para-professional. See Appendix D for a modified example of the Visual Motor Manual. For the materials used in Visual Perceptual Training sub-system, see Appendix A (materials list).

Auditory Perception (i.e., auditory linguistic analysis and language acquisition)

The need to improve the auditory information processing skills of urban kindergarten and lower elementary pupils has been well documented in the current child development research literature. Our assessment and evaluation data also reinforces the observations and findings summarized in the educational literature.

Based on this body of knowledge, which points up the strong need for skills training in learning how to listen, follow direction, and the decoding of school based language and information, we developed a highly intensified program of listening procedures which centers around the following media equipment and "soft ware" technology.

Each classroom in the project is equipped with:

1 - Norelco 150 Cassette Player

1 - Califon Listening Center

10 - Headsets.

This equipment is organized in a listening area which is permanently established in a convenient space in the room. The headsets and listening center remain on the desk, organized for use at any time.

The listening curriculum is conducted for fifteen minutes each day with groups of eight to ten children. While the teacher is doing listening, the para-professional is working with the balance of the class on visual motor training tasks.

The "soft ware" curriculum is organized from simple to complex. At the kindergarten level we use the following learning systems. For name of publishers see materials list, Appendix A.

- Talking with Mike by Dr. Ruth Golden
- Listen Mark and Say by Dr. Leo Gotkin
- Trip to the Moon by Dr. Leo Gotkin
- Ears
- Space Talk
- Audio Reading Lab-Level A
- Michigan Language Program by Smith and Smith

The above list of software systems are designed to enable the child to develop attending, temporal sequencing and automatic auditory processing skills vital to school learning and survival. Much of the materials also reinforce the much needed skill of following directions. Some of the recently added materials such

as Ears, Space Talk, Audio Reading Lab - Level A, and the Michigan Language Program are designed to assist pupils in developing the initial skills associated with the early stage of reading: word attack, vocabulary, use of clues and language analysis.

The listening center approach to learning is a vital and critical need of urban children. Teaching auditory linguistic process tasks is a vital area of intervention in this project.

Auditory linguistic learning of school based language may very well be one of the most critically overlooked needs in the public education of urban pupils. We have tried to develop in this project a highly sequentialized program of auditory process learning and auditory linguistic tasks which will assist the pupil to learn the language of the school through the process of auditory learning.

THE FIRST GRADE PROGRAM

The first grade curriculum in the Project continues to deal with the developmental readiness-for-learning curriculum. One of the major objectives of the program is to help pupils master skills that are pre-conditions of more formal learning and which often are assumed in traditional programs. Further, the skills levels continue to increase in difficulty in all areas of the taxonomy.

The learning and educational package and media software materials become more difficult and specific as the pupil progresses through the program. There are, built in at every level, process assessments to assure that pupils are, in fact, attaining the levels of skills development at the 80 percent criterion established for the entire program. Two Title III - 306 staff members along with the classroom teacher engage in process checks at time intervals specified in the evaluation design. This information is given to the teacher and is also used for the interim report, which is used as a tool for programatic improvement, change in process behaviors of learners, and as a management tool for decision making relative to the effectiveness of the intervention.

Curriculum at this level is scheduled in 30 minute frames. The pupils are divided into four groups. These groups change every 30 minutes in a revolving procedure.

In a typical Title III classroom, at the first grade level, one fourth of the pupils are having:

1/4 Distar Reading - Classroom Teacher

1/4 Visual Motor Training - Para-professional in the classroom

1/4 Distar Language - Language Teacher out of the classroom in assigned space.

1/4 Movigenics - Physical Education Teacher, also out of the classroom in assigned space.

During a second one hour time frame the classroom teacher engages three different groups of pupils (10 or less) in auditory perceptual training procedures using a variety of special software media systems designed for this purpose. (See

materials list, Appendix A.) While the teacher is engaging a group of pupils in listening, the para-professional is directing prescribed visual perceptual and pre-writing programs as outlined in the handbook of Visual Motor Training developed by the program staff. By organizing time, space and personnel in this fashion, we can insure small group instruction, intensification of instruction, and an organized sequential and structured program using specifically researched educational materials organized in a systematic way from simple to complex, based on the patterned needs of small groups of pupils with similar learning profiles.

By the management of the learning environment we are also able to change teacher behavior and to insure that diagnostic needs of pupils are specifically attended to. Further, we are able to train teachers, para-professionals and ancillary personnel, on the job, in the new use of time, space, new educational packages, and how to use the concept of a diagnostic-prescriptive approach in the educational management of pupils.

The next step in the programatic development is to write specific instructional objectives for every area of the readiness-for-learning taxonomy. The specific areas covered in the first grade program are the following readiness for learning skills used in school.

- Gross Motor Learning - Movigenics Curriculum
- Visual Motor Perception - Visual and Fine Motor Training Curriculum. (See Visual Motor Training Handbook developed by the Title III Staff.)
- Auditory Perceptual Training Program (See materials list, Appendix A.)
- Distar Reading System I, II, III
- Distar Language System I, II
- Pupils also have Arithmetic, Art, Music and whatever other curriculum the school offers.

THE SECOND GRADE PROGRAM

At this level in the curriculum the students are proceeding into higher levels of patterns of learning tasks. Hierarchies are patterns of learning tasks that lead up to a terminal skill. Each subordinate task would be a prerequisite for the task above it and would mediate transfer for that task. The basic premise underlying learning hierarchies is that failure to learn a particular skill is principally due to lack of essential subordinate skills, and conversely, that learning should be easy to induce if all relevant subordinate skills are possessed by the learner. Presumably, the use of hierarchies can help overcome the difficulties many learners find in trying to acquire skills at all levels of school learning. As described above the necessity for recycling pupils who fail to master basic skills after initial exposure seems to require additional exposure to basic program tasks. At this level we find a vast spread occuring in the learning rate among the students. The program proceeds primarily on the mastery level of the students. All pupils have been regrouped when entering second grade based on their Distar Reading levels. All group one (1) Distar pupils comprise a single class, all group two (2) and three (3) make the other classrooms. At this level all pupils receive the following prescriptive curriculum.

- Movigenics (all)
- Visual Motor Perceptual Training (only the slower pupils who require it)
- Auditory Perceptual Training (all pupils receive training at different levels of skills proficiency and difficulty). The program materials become more highly complex at this level. Each of the three groups in every classroom in the Project spend twenty (20) minutes per group on listening activities. Each classroom is equipped with a listening center and organized "software" curriculum for listening and language development. (See Appendix A.)
- Distar Language I - II: All pupils receive instruction from a special language teacher. Some pupils, based on their learning rate, are in Distar I, and pupils are in Distar Language II. At the Distar Language II level the cognitive skills process comes into play along with the

increased complexity of the use of logic and language for reasoning, problem solving and thinking. It takes 50 percent of the pupils three years to complete Distar Language II, which means to the end of third grade.

- Distar Reading I - II: In reading, the pupil's learning rate again determines how fast each pupil progresses through the reading curriculum. Each pupil must master 80 percent of the basic skills at one level before moving to the next lesson of higher difficulty. There is much recycling based on built-in criterion testing. Because of the need for skill mastery at the second grade level there is again a large spread in levels of mastery. Some pupils will only complete Distar I by the middle of the second grade, and they will not complete Distar II until the end of third grade. Other pupils complete Distar II by the middle of second grade.
- At the second grade level each classroom in the entire Project in all four schools is scheduled for fifty minutes into the High Intensity Learning System - Reading, designed by Dr. S. Alan Cohen and distributed by Random House. (For details of this portion of the program, see Appendix B.)

The entire curriculum process in the program, at this level, is designed to intensify, at higher levels of difficulty and complexity, those skills so vital to school survival. These skills are: language, reading, and cognitive-symbol skills associated with decoding, short and long term memory, attending to details, specific meaning, following complex directions, logic and reasoning skills for strategy building, and learning to write expressively. The curriculum complexity is based upon the learning rate of each individual learner geared to his level of mastery of the skills being taught.

The entire second grade curriculum is scheduled and organized in time and space outside of the classroom, as it is at the kindergarten and first grade level.

The addition of the High Intensity Learning System - Reading at second grade level adds an extensive curriculum in all the language, listening and comprehension

skills required for pupils to become mature readers. The linking of the Information Processing Model with the High Intensity Learning System - Reading makes for a near complete elementary educational model, with an opened-servo system for improvement, expansion and further development of the curriculum needs of urban pupils as they are discovered.

For all other areas of the curriculum such as arithmetic, art, music, science and social studies, the teacher follows the standard curriculum.

The Title III - 306 Program at the kindergarten level is scheduled for two hours every day, and at the first and second grade level the program is scheduled for two and one half hours each day.

Reading at the Second Grade

At the second grade level all children in the program are proceeding through the Distar Reading System in small groups with pupils with similar learning patterns. Children are moved between groups based upon each child's rate of learning and mastery. Shortly after the mid-term of the second grade, many of the top group (Group I Pupils) finish Distar II and proceed into Distar III or any of the other upper elementary reading programs, such as Lippincott, SRA or the Bank Street Reading Program, depending upon the particular school. Distar III has been well received in those schools where funds have been available to purchase the system. We highly recommend Distar III as an instructional system for reading at second and third grade level.

In order to intensify the reading process and to systematically improve the reading levels of pupils in the project, we have linked the Information Processing Model Curriculum of Learning Readiness with the High Intensity Learning System - Reading developed by Dr. S. Alan Cohen and Dr. Anne M. Mueser, and distributed by Random House. There are four of these centers, one in each of the four Title III schools.

The HILS - Reading has four basic components:

- A Classroom Management System that enables one teacher to manage the individual curriculums of thirty (30) or more students per class hour

(150 students per day). The heart of that management system is the Catalogue of Instructional Objectives and Prescriptions. With each of the 500 specific reading objectives in the catalogue is a list of precise instructional activities enabling the teacher to prescribe for each student's unique needs. These needs are pinpointed by criterion performance assessments, called "Check-Ins", for each instructional objective. A parallel set of "Check-Outs" assesses mastery. A single-page student record form allows the teacher to keep all the records needed.

- A Collection of Reading Materials from over fifty (50) different publishers includes books, kits, audio-visual materials and workbooks, all self-instructional and many non-consumable.

- A Staff Development and Support System. Random House provides professional consultants to supervise the training of teachers and to support this unique curriculum design during its first year in operation. Before the end of the first year, the school is able to administer HILS and implement its own staff development without outside consultants.

- An Update and Modification System. Every operating High Intensity Reading Center is provided with the latest modification of management strategies. Because it is an open-end changing system, HILS maintains a national dissemination network available, including the information necessary to code in these materials as Catalogue Prescriptions.

PROCESS EVALUATION

For detailed analysis of the evaluation design and procedures the reader is referred to Appendix C.

A similar evaluation procedure was conducted at each level every year. We also conducted an in-depth "good - poor reader" research on eighty (80) pupils, split into two groups (40 "good" readers and 40 "poor" readers) selected at random from the total population of second grade pupils in the project located in the four different project schools.

"Good" readers were the forty (40) highest MAT scores in rank order, while the "poor" readers were the forty (40) lowest MAT scores in rank order from the lowest score upwards. The MAT scores at the end of first grade were used as the basis of selection.

Over the past three years of this program, much time and energy has been devoted to the development of process evaluations and observations. If we are to solve the failure problem in urban education, we must develop information at the process level in the classroom. This will require much additional effort on the part of the educational leadership in the schools and the skills of not only the teachers, but all the ancillary personnel associated with elementary classroom activities. At the present time we do not possess sufficient information as to why children succeed or why they fail in school. We spend too much time attending to product outcomes, when in reality the process is the product. If we really want to move toward the solution of our educational problems in urban education, much effort, similar to the evaluation efforts worked out in the Title III - 306 evaluation design, is absolutely imperative.

All the interim reports of the Project evaluators, issued over the past three years, were primarily based on our process evaluation procedures. (See Appendix C.)

Copies of all interim reports, based on the process evaluation, are available from the Project Director.

PRODUCT

OUTCOMES OF THE PROGRAM

The Title III Program developed, in depth, the following procedures in the three major areas of the Title III Guidelines, i.e., Management, Process, and Product.

The product outcome in the management process over the three years of the Project's existance has been the development of a systems approach as a management tool. The delivery system developed around the systems notion is derived from:

- System Science Knowledge
- Systems as Technology.

Applied system science deals with the study and analysis of "organized complexity". Associated with this discipline are two interacting disciplines of topology and cybernetics, which are two ways of using data and information for decision making and organizing resources.

Another management tool which has been extensively used to organize both process and product outcomes is the concept of models. As previously defined in an early section of this report, a model:

- Describes and helps us understand complex systems
- Helps us learn complex skills
- Helps us see new relationships
- Provides the framework for experimentation
- May indicate areas in which experimentation is not possible
- Assists in engineering design.

The basis of the readiness-for-learning curriculum is an Information Processing Model. Within this model are all the above defined aspects of a systems approach. The model, as a management tool, helps us to understand the complex process of decoding and learning required of the human organism, if it is to adapt in a school environment.

The model also acts as a basic outline for organizing: classroom environments, time-space continuum, material, supplies and media purchases, organization of instructional objectives, the design of both pupil and curriculum assessments and in the use of an evaluation design and the employment of an outside evaluator and educational accomplishment auditor as mandated by the Title III guidelines.

All of the above concepts have successfully been applied in the Title III Project.

Process

The Title III - 306 guidelines put strong emphasis on establishing a much neglected area of public education: evaluation and assessment of process outcomes.

During the past three years much time and energy have been devoted to the development of the techniques for assessing what takes place in the educational process after instruction has occurred. The evaluation designs developed by each of the evaluators employed by the Project Director made a direct contribution to the development of these management tools. (See Appendix C.)

In the area of process evaluation, there is much additional work required before more explicit and definitive outcomes can be understood. One of the most necessary parts of the process management area is the writing of specific instructional objectives in behavioral terms. Associated with this process is the development of criterion reference tests and the development of pupil process records of what skills areas pupils have succeeded in and what areas still require work. The Project Director will continue to develop the process objectives and criterion assessments even though the program has ended.

Product

The use of the achievement test and standardized reading test is one of the most unsatisfactory of management tools. The results from such tests do not give you information until after the entire instructional year has been completed. This ad hoc data is of little value for correcting the ongoing process.

The product test scores often do not measure what has been taught. This is especially true of the MAT Reading Test. It often does not reflect how much children

have learned in a project design, such as that used in the Title III model. Furthermore, it does not reflect very efficiently the results of a reading system which teaches decoding skills, such as the Distar Reading System.

An Introductory Statement on the Results and Conclusions

At our present level of knowledge, educational research is never likely to be able to point to such dramatic breakthroughs as the Salk vaccine, unlocking the power of the atom or getting to the moon. In educational research gains have been, and will continue to be, small and incremental rather than occuring as discrete and dramatic accomplishments. To educational administrators who become impatient with educational research because it does not produce dramatic change or findings, we can only say please be patient and learn to be satisfied with gradual improvement, rather than in one or more quantum jumps in effectiveness. We can recommend, however, that a strong R & D department is urgently required in large school districts like Newark. We need to utilize new research knowledge to create, rearrange and improve our current learning environments at the classroom level, if we are to solve the learning and educational difficulties of urban children. The staff and the Director of the Title III - Program have tried to synthesize the major and important contributions of R & D to education in the past decade. These include:

- Detailed analyses of the steps in basic learning of language and number skills which will lead to programs for individualized instruction.
- Research tested instructional packages. These have been extensively utilized in the educational structure of the Title III Program.
- Use of reward and reinforcement schedules as a means to improve classroom behavior and academic achievement.
- Assessment procedures tailored to specific educational objectives, permitting specific evaluation of how well the objectives are being achieved.
- The use of data and empirical findings for the development of curriculums structured base.
- Use of formative testing as a measure of the effectiveness of educational intervention.

The results and conclusions that follow are from the Program data, observations and applied theory. These results are based on a quasi-research design which attempts to utilize the above findings and the philosophy of science approach utilized by today's educational researchers.

RESULTS AND CONCLUSIONS

Results

The following summary is what the data indicates about pupil performance and the effects the readiness-for-learning and reading curriculum has on various groups of pupils receiving treatment in the program. This data is from the evaluation report submitted by Dr. S. Alan Cohen for the end of the second project year, i.e., end of first grade. It should also be mentioned that the basic quasi-research design of the Title III - 306 Program is longitudinal in nature. Children who remain in each school have received the educational treatment provided by the curriculum for a period of three years, starting with kindergarten through and including second grade. For anyone interested in the statistical data there are complete computer print-outs on all data coded to all the significant tables in the final report. These records are open to any who might be interested. The following statistical operations are coded for computer analysis which consists of:

- Analyses of variance to test differences in means.
- Pearson Product moment correlations.
- Point Bi-serial correlations.
- Multiple correlations were run on all the appropriate data, including pre-post gain scores.
- Regression coefficients were drawn allowing the evaluator to designate the exact amounts of gain or loss in original raw score units (grade, age, days absent, etc.) of the independent variables that could account for the gain or loss in the dependent variable. (For more detail see Dr. Cohen's Final Report: End of Second Project Year). The data analysis was organized by Dr. Cohen for presentation to the computer and for the formulation into tables. In order for the reader to understand how the data is organized by Dr. Cohen, it is necessary to present the model he used.

Dr. Cohen designated the:

- Peabody Picture Vocabulary Test (PPVT)
- Illinois Tests of Psycholonguistic Abilities (ITPA-2) subtests were used: Grammar and the Association subtest (Experimental Version).

- Lorge Thorndike Intelligence Test: Level I - Form A.

As an identifiable category of language and cognition, "ability" tests as distinct from the reading and perceptive-motor categories. Dr. Cohen further states "abilities do not imply inherited potential. As this and dozens of other studies demonstrate, the variables tested on these instruments are able to be learned and, therefore, able to be taught. These "abilities" appear less specific and are the more global behaviors underlying reading and writing. They were analyzed as those behaviors that lurk just behing the obvious reading behaviors tapped on the Wide Range and Metropolitan Achievement Test". *

Analysis of Reading Test Scores:

- Wide Range Achievement Test
- Metropolitan Reading Test
  - Word Knowledge
  - Word Discrimination
  - Reading - Comprehension.

The basic evaluation design was post-test analysis using national norms as the comparison criterion.

The tests were given at grade on (actually at grade 1.7). Two basic forms of data were used: the grade level score and the percent of students above grade level.

* Final Evaluation Title III - 306 End of Second Project Year - Evaluator, Dr. S. Alan Cohen. A copy of Dr. Cohen's report can be obtained from Mr. Robert D. Adams, Newark Board of Education, Newark, N.J.

Summary of Results End of Second Project Year

- The students who had a previous year of program treatment in kindergarten, in seven months of instruction in grade 1, made:
  - On the PPVT, about 8 1/2 months growth
  - On ITPA Grammar subtest, about 15 months growth
  - On ITPA Association, about 15 months growth
  - On the Lorge Thorndike, about four (4) IQ points to 98 IQ.
- At the end of grade 1, the Title III - 306 students, as a whole, were still 30 months below norms on PPVT, 17 months below norms on ITPA-Gram, 6 months below norms on ITPA Assoc. and 3 IQ points below the magic 100.
- The boys did slightly better than the girls on all the ability tests. Those Title III - 306 first graders who had a previous year of Title III kindergarten did from two to seven months better than the students who had no Title III kindergarten on PPVT and ITPA. They also got 6 IQ points more as well.
- Neither absences nor age influenced gains on PPVT, ITPA or Lorge Thorndike.
- As a whole, the students exceeded grade level on the Metropolitan Reading Tests, but just missed grade level on the WRAT.
- The second year in Title III - 306 students did three to four months better in reading than the first year Title III - 306 students.
- Twenty to 28 percent more second year Title III - 306 students exceeded grade level in reading than did first year Title III - 306 students.
- Avon Avenue School students did consistently better on the reading post-tests than the other three schools' students.
- The girls did slightly better than the boys in reading.
- Absences influenced reading scores. Ten absences equals a 40 percent to a full month's loss in reading score.

- Jumping, Body I. D., Wepman and Beery improved significantly.
- Boys gained more on the Purdue Backward, while girls gained more on Jumping.
- The students who were in Title III - 306 kindergarten a year ago did better on the Wepman than did children new to the treatment.
- Absence had no influence on perceptuo-motor performance.
- The Wepman has very little to do with reading, but seems to be related to PPVT performance.
- The Beery is highly related to all four reading tests.
- But all the movigenics tests have no relationship to learning, language, and reading abilities tests in this study.

Conclusions

The following conclusions are from Dr. S. Alan Cohen's final evaluation report at the end of the second Project Year:

- The data shows that by all reasonable criteria the Title III - 306 Project was dramatically successful. The pupils who have two years of program treatment showed gains greater than what normal middle class children ordinarily make on most of the reading and ability tests.
- There is no question that children benefited far more after two years with the program than after one year. (This is viable reason for institutionalizing this curriculum at kindergarten and first grade. The results are empirically validated.)
- Even with the dramatic gains shown in the "abilities" skills profile of project population, the educational deficits on those evaluation instruments requiring language skills remain significantly low. Continued programatic treatment is recommended at least for another year in order to permit a larger number of pupils to master these critical decoding language skills tapped by the PPVT and the ITPA.

- The program had a marked effect on reading achievement, especially on those pupils who had attended the Title III - 306 kindergarten the previous year. Fifty to sixty percent of the second year Title III - 306 students scored above the national norms compared to twenty-two to thirty-nine percent of the first year Title III - 306 students.

- The data also shows that the Distar Reading System does not produce significant gains in reading comprehension as it does in word attack skills as measured by the Word Knowledge and Word Discrimination subtest of the Metropolitan Reading Test.

- The Distar Reading System does enable pupils to learn to decode early in their school life and it also enables them to experience success in learning the code of the graphic symbol system. It also seems to meet the assessed language needs of all the pupils in the program, because it is sequential, structured, based on a success model, and the system permits pupils to move at their own rate without the pressure of competing with pupils who learn at a faster rate.

- The Distar Reading System also is geared to "mastery learning concept". The child only moves to a higher order skill after he has met a fixed criterion of skills learned at a lower level.

- School environments do seem to make a difference on the reading achievement of pupils. Avon Avenue and 14th Avenue showed consistently higher reading achievement scores compared to Harriet Tubman and 18th Avenue Schools.

- Once again, the variable of sex difference indicates that girls on all three tests of the MAT outperform the boys. But we continue to teach as if boys and girls both learned to read at the same rate, when this does not seem to be the case.

- Absence influenced reading achievement on the post-test reading performance from 2/5 to a full month's achievement for every 10 absences.

- Attending the Title III - 306 kindergarten did have substantial influence on the Wepman Auditory discrimination of word pairs.
- The data also shows that the lack of correlation between the group of skills termed perceptive motor by Dr. Cohen, and measured on the Roach-Kephart Motor Performance Scale and Beery Visual Motor Integration test, do not contribute to the learning abilities of this population. The correlations between perceptive-motor tests and the "abilities" test - PPVT, ITPA and Lorge Thorndike IQ hover around the zero correlation figure.

These are additional conclusions that can be drawn from the data:

- There are several important findings provided by the data that should have significant effect on curriculum design and administrative direction, if we are to find the solution to learning and reading failure of pupils.

  We can predict, with a high degree of probability, who the reading and learning high risk pupil will be at the end of second grade. We can do this very successfully at the end of kindergarten. Why do we wait, as we do now, until the end of third grade?

- There are several significant skills areas which still do not respond rapidly enough to treatment. These are:
  - Attending to critical cues.
  - Difficulty of following directions presented verbally.
  - Difficulty with auditory processing of three level commands.
  - Short term memory.
  - Blending: spelling words by sound.
  - Reading comprehension skills as measured on the MAT.

The following conclusions relate to the management and process objective of the Project:

- The concept of a systems approach as a management tool, using an Information Processing Model, is an excellent means of delivering services

and of organizing learning environments and personnel to achieve change in an elementary school.

- The use of an evaluation design is an efficient way to obtain process information about classroom learning environments and is an excellent way of obtaining data about these environments in order to improve them.

- There is one dramatic fact that can be concluded from the data and organization obtained from the system used in the Title III - 306 Project. We can bring about significant change in the performance of urban pupils. They can learn! Of this there is no doubt! The most difficult and obvious fact, however, is that we seem to be totally unable to "sustain change" in schools, even when it is empirically supported by data, political backing and professional consent. Why this is so will be dealt with in the section of this report titled "Going Beyond the Data Given".

GOING BEYOND THE DATA GIVEN

This section of the report consists of an integration of the analysis and synthesis of information, observations and experience coupled with the data obtained from our program evaluation procedures, evaluators and consultant advice and input, along with current knowledge obtained from the educational research literature and other government programs developed over the last ten years. The remarks and observations presented here are what appear to us to be some of the interpretation that can be made from a change model. The analysis and conclusions reached are the basic processes which need to be established, if we are to move in a direction of successful approximation to the solution of the educational problem confronting urban elementary education.

The areas covered in this section of the report are not necessarily sequential, but all the analyses are pertinent in a system directed to obtaining information to be used in solving problems. These are some of the concepts and ideas which the data suggest to us, but which are often overlooked or deliberately ignored when attempts are being made to find workable solutions. We also offer these analyses to encourage further study and discussion of the more difficult problems that confront the educational leadership in the schools, but which are also at times politically unsavory and too difficult to deal with, so that they are ignored. A change agent has an obligation not only to bring about change in schools, but to sustain change and to speak to those bureaucratic processes, political-social situations and human indifferences which prevent the sustaining of change after it occurs. This then is the main objective and goal of the analysis that follows.

As a support for the validity of the findings and outcomes of the Title III - 306 Project based upon the Information Processing Model, a review of some of the current research in reading is presented.

The implications of current reading research and how it relates to the Title III - Information Processing Model is outlined in the following analysis:

Our data (recommendations from our Program Evaluators and Project Literacy at Cornell University, outlined by Joanna Williams, one of the principal

investigators) offers suggestions and leads which we highly recommend to all administrators, teachers and ancillary personnel. The data also offers support for the findings of this program.

"Most of our current theories of reading stem from research in cognitive psychology. The field of cognition, like the reading process, is highly complex. Cognition is the study of the process by which knowledge is acquired: this includes perception, memory and thinking. When this knowledge is applied to basic cognitive processes as they are manifested in educational-type tasks, we get the following recommendations from the experimenter in the psychology of reading.

- In the first phase skills that are fundamental to learning to read are developed, namely, speech and the "graphic art". Since, for the normal child, written material is a second-order-symbol system that decodes to speech, some competence in learning and speaking must precede the reading act."*

(This is a reason for using both Distar Reading and Language Systems as an instructional device.)

A theoretical reason for the use of visual motor perceptual training programs in a readiness system is outlined further in the Gibson model:

"The fundamental 'graphic art' is scribbling, and the reinforcement for this activity comes from the opportunity to see marks just made. The child develops awareness of graphic features such as continuity, intersections, part-whole relationship, position in space, etc." (See Appendix A for the detailed subsystem for such training; also Appendix E.)*

"The child then differentiates 'writing' and 'drawing' and then must differentiate the alphabet letters."

* Joanna Williams - "Learning to Read: A Review of Theories and Models" - Final Report ----------(See Appendix E).

Gibson states that "the differentiation is done on the basis of distinctive features. Learning the distinctive features and shapes of the letters is called 'content learning'".

"In addition to content learning, perceptual development also includes the development of active strategies, such as comparison and systematic scanning. Both the content and the strategies are motivated by a desire to reduce uncertainty and to give structure to the world. It is this that reinforces perceptual development."

The second phase involves decoding, that is, mapping written text to speech sounds. There is no one-to-one correspondence between sound and orthography; and Gibson recommends that training in correspondence be done within a rule-oriented framework, so that children will be able to make inductions from a wide variety of examples.

The third phase concerns learning rules of unit formation. As the child becomes more skilled, he will use the structural principles to organize information and he will be able to read in larger, more efficient units. Gibson has noted the following type of structural principles in written text: correspondence rules between the phonological system and the graphological system; rules of orthography, with no consideration of sound; grammatical constraints; and meaning, which provides context and expectancies about what is to come.

In summary, Gibson's work is aimed at discovering the unit-forming principles in reading activity and, when they are determined, the training methods that will promote effective strategies of perceptual search and detection of structure.

The Information Processing Model utilized as the basis of the Title III - 306 Program has attempted to apply many, if not all, the principles outlined in the Gibson model.

A further summary of reading research suggests that much of what we have been doing in the Title III - 306 Program has validity, relative to current knowledge based on this research. Joanna Williams, a principal investigator from the Project Literacy and the present editor of the Journal of Educational Psychology, stated that we do have some knowledge of how a good program of instruction should be constructed:

- It is structured and organized.
- It minimizes possibilities of failure.
- It starts with simple high-contrast, highly cued items and progresses toward complex items which have stringent response requirements.
- We have knowledge about learning strategies that can be built into instruction for rehearsal, for organization and for rule learning.
- We know something about engineering attention in the classroom.
- We are fairly sure that we should concentrate our efforts for the most part on direct instruction (Distar and the entire Title III - 306 Program is predicated on the direct teaching process), and not rely on what will be achieved through transfer, a major assumption of traditional education.
- We can provide for individual differences in rate of learning and, to some extent, preference (the basic concept behind the High Intensity Learning System-Reading).

"But to do the job well, we must learn much more about all of these things. We are just beginning to develop our understanding of the complexities of the reading process and the way in which the skills of reading are acquired. In a large measure, the extent to which we make further progress will depend on future development in the broad area of perceptual and cognitive development research."*

The entire macrosystem of the Information Processing Model is devoted to such empirical development coupled with a systems approach as a model for unlocking the complexity of the reading process and as a way to apply, in a synthesized manner, the best of current research in cognition, perception, language acquisition and development, research on the reading process, learning to read, and the development of reading models. We have demonstrated the value of the Information Processing Model both as a management tool and as a way to utilize research

* "New Theories of Reading - What Do They Tell Us", by Joanna Williams, Teachers College Record, May, 1974, Vol. 75

on reading and how to develop working comprehensive, integrated, sequential programs at the school based level. To the critics of this approach and to our many other detractors, all we would like to say is, please, look at the current research in reading and our data and observe the behavior of pupils in such a program objectively; and, if you are professional in your beliefs, you will have to shift from the more traditional artistic "creative" approach to a more empirically based model, if you are really interested in helping pupils to read rather than continue to engage in valueless polemics based upon "I think and I feel".

Administrative Attitudes and Behaviors

It would appear that administrative attitudes and behaviors towards change, at the school based level are ambivalent at best. If change interferes too much with the pragmatic function of the principal or the teachers, a subtle resistance to the change process automatically occurs. This group phenomenon may be explained by some recent research that suggests that people may be "programmed" by our culture to behave in ways that cancel out their uniqueness and reduce their effectiveness in groups. People inculcated with such behavioral incompetence will tend to design organizations that protect their domains from change. Consequently, the internal activities of schools towards educational innovations will become defensive. This defensive posture can be either overt or covert and will create conditions of organizational entropy,* whereby the school organization will tend to produce valid information for the unimportant problems and invalid information for the important issues. This type of attitudinal condition in the schools causes educational innovations to deteriorate, even if the data and political, economic or social forces are in favor of change. This phenomenon of resistance is so covert and subtle that it is difficult to combat or overcome and is the major cause of why there can be no "sustained change" in curriculum or product outcomes at the school based level. Until administrators and teachers really want change to occur there can be no "sustained change" in our schools no matter how viable the change model might be.

This then should be one of the major concerns of the top level policy administrators. How to bring about meaningful change and then how to sustain change when it has occurred. After OE's ten years of organized innovation in urban centers, it is difficult to document areas of "sustained change", even after initial change in curriculums have been successful.

* Entropy/Social: The doctrine that with every social change the energy available for further progress is less, so that in the end every society becomes static.

This remains an unresolved educational administrative problem. It may be a major variable in why we have been unable to solve the educational failure rate of urban students. The Title III - 306 Staff and its director have experienced, in depth, all the phenomena delineated in the educational change research literature. The fate of the Title III - 306 Project has followed pretty much the same course as has most other Office-of-Education sponsored projects directed towards change at the school based level. It is about to disappear, in spite of the fact that the data indicate that the program works much better for urban pupils than do more traditional educational models. We would like to finish this analysis with a question: Why develop change models at all, if they are not to be sustained, after it is demonstrated that they work?

Teachers as Change Agents

Until we are able to organize an "on-the-job" system of training for all classroom teachers that is based upon a management-by-objectives approach for organizing the learning process, the skills development of students and the use and application of the current research findings related to language and reading, change in any real form will be most difficult to obtain and even more difficult to sustain. Let me hasten to point out, however, that the inability of the teacher to become a "change agent" is not the teacher's fault. She is a product and victim of both current and past teacher training systems. These same teacher training systems, when linked with the current traditional educational models, result in a system which is self sustaining. The young teacher really is not trained or equipped to be a change agent by the present teacher training systems, nor is she assisted in becoming a change agent when she moves into the "traditional educational model" used by urban schools. In fact, almost every variable in the present environment in our schools mediates against change. The teacher is responsible, in a sense, for maintaining this model and any attempt by an outside agent (like the Title III - 306 Model) to bring about change acts as a threat to her, to the administrators and the ancillary personnel in the schools. Many teachers, however, rhetorically request change when they see how difficult it is to help most students that they are responsible for. Even this body of teachers find change difficult when the

opportunity is presented to them. The reason for their difficulty, even when they seem motivated to change, is a crucial human factor-subtle resistance to both change and the need for a high level of energy output required to bring change about and to sustain change when it occurs. Changing teacher's habits is a most difficult process, as is most human change.

The analysis of the "change agent role" is stated here for teachers, because the "teacher is the key" to the entire change process, if we are to change the direction of failure in urban schools. However, it is almost an axiom: if principals and city-wide higher administrative levels are not fully committed to the change process there can be no real change in the educational process at the school based level. Therefore, any program which attempts to train teachers as agents of change has to have the leverage and the meaningful support of all administrators, or no meaningful sustained change can be accomplished, no matter how much government money we spend. Money is only part of the equation. We have analyzed and synthesized in the Title III - 306 Model the basic needs of pupils and a system for obtaining and sustaining change at the classroom level, but what is most needed at this time is not only teacher education, but education of the upper levels of administration about the change process and its structure for problem solving.

Teachers are critical and they are at the cutting edge, but even if we could change teachers to be more effective problem solvers, without the leverage that really supports change at the higher level of education, "sustained change" can not occur.

Para-Professionals - (Teacher-Aides)

The Title III - 306 Model calls for the extensive and intensive use of para-professionals. We used a concept in the training of teacher-aides, which from our standpoint worked very well, in spite of our many critics and detractors. We attempted to train aides "on-the-job", by giving them a short three-day work shop, where time permitted, and then continued this training "on-the-job". In the Title III - 306 Model the aides are responsible for the Visual Motor Perceptual Training (see Appendix A). We found that if you want someone to learn something new and different, the best way seems to be to let them do it and also teach by telling at the same

time. With very few exceptions, the teacher-aides not only made the match required of the tasks related to teaching motoric and perceptual process skills to young children, but they often excelled at it. It has been most rewarding to the Project Director to see adults with no previous instructional experience in schools become skilled educational technicians in assisting children to learn critical readiness skills. In fact, we are only beginning to understand how much teacher-aides can assist us in education and in the building of basic skills processes of students. It also appears to us that the basic experiences and backgrounds of the aides has added immeasurably to their learning the role of educational facilitator. We have also found that teacher-aides, in many instances, are extremely sensitive to the kinds of basic changes that are needed in the educational process. This area of knowledge and insight should be sought from the more knowledgeable teacher-aides and where the feedback information applies, in the educational curriculum, the suggestions and advice should be pursued. To those who are critical of such insights, let them keep in mind that many of our current teacher-aides are products of the Newark School System and they, above all, should know where the mismatch between wheat they needed to know in the way of basic skills, and what they received in the educational process, were not met. Many aides have discussed this aspect of the educational process with the Project Director. When histories of individuals are obtained randomly in reference to what is missing in their educational experiences vs. what they should have been taught, it can act as an empirical base for change.

In closing, we make a strong plea for a more extensive use of teacher-aides up to and including the third grade level, and that teacher-aides be trained as educational basic skills facilitators in all areas of the curriculum. If this is done, the teacher, as the professional, can become the manager of the entire educational process and the diagnostic-prescriptive professional educator that she should be, but cannot find time to be, in the more traditional model which requires her to be all things to all students.

RECOMMENDATIONS

Although the recommendations that follow this brief statement may appear to be obvious and self evident to many who read them, putting them into operation is a difficult and challenging task. Risk taking is not the forte of the majority of those engaged in educational endeavors. To carry out successfully all the attached recommendations would require a body of trained and dedicated administrators, teachers and ancillary personnel equipped with the spirit of change. What is needed is leadership which is willing to risk to develop the energy system required to inaugurate and sustain change by developing a professional climate that rewards the risk takers who have the knowledge and willingness to innovate and to support such professionals when the "fire fights" to resistance develop. It is to such leadership that the attached recommendations are addressed.

The attached recommendations can all be inaugurated. The educational technology and systems for teacher training in such technology are available! To any administrator who wishes to explore the implementation of these recommendations and who is willing to risk initiating change in his school, the project director of the program is more than willing to assist him in establishing this model and all the attached recommendations for use in his school.

The attached recommendations are also the next level of integration and growth of the Information Processing Model and the systems science concept as outlined in this report. It is professionally unfortunate that we cannot continue to add the "learning centers system" for each classroom and the process of individualized - prescriptive education based on instructional objectives, mastery learning, all organized around the needs of the individual learners, managed by each classroom teacher trained in these techniques. To the administrators who have read this report to this level, we can only say that, if you are professionally interested in children, some, if not all, of the solutions to urban failure are buried in the results which would be forth-coming from the implementation of the attached recommendations, <u>if</u> they were <u>implemented systematically by motivated and interested professionals.</u> If this project acted in any way to motivate administrators to think along the parameters outlined in the attached recommendations, then some value has been attained from the working process of this program.

RECOMMENDATIONS

1. We recommend that, starting with pre-school, all learning processes relating to language development, reading and arithmetic be organized on the basis of a systems approach, utilizing a management-by-objectives technique.

   Within the above recommendation, it is strongly recommended that a taxonomy of critical language, reading and arithmetic skills be organized for each level of elementary education, starting with pre-school. (See Carol, Bloom, Merril, Cohen, Gagne', et al.)

   It is also imperative that a permanent "skills inventory" record be established for each pupil entering the educational process. This skills profile is to be a permanent record.

   In order to establish a record it will be necessary to pre-assess every incoming pupil to establish what "skills" he has and what "skills" require development in the areas of language, reading (decoding, sight words, vocabulary, comprehension, etc.), and arithmetic. This assessment should also include pre-natal, pari-natal, and post natal history, medical profile and childhood diseases, accidents and other traumas, if any. All data is to be used to develop the proper diagnostic-prescriptive educational program for every child in the first four grades of elementary education.

2. All learning environments in elementary schools should be organized on the basis of a diagnostic-prescriptive process using the taxonomy of skills, instructional objectives, pre-post criterion testing organized around either individual or group learning patterns of the pupils.

3. All instruction should be based on the diagnostic skills needs of the pupils in the three areas of the curriculum: language, reading and arithmetic taxonomies.

4. Each classroom learning environment should be organized to efficiently utilize a "learning centers" technology, in conjunction with skills taxonomy, coded to instructional objectives, pre-post criterion tests, student skills profiles and diagnostic-prescriptive instruction facilitated by the teacher.

5. In order to assure that the preceding recommended technology works for children, teachers must be encouraged to keep detailed performance records of each pupil's strengths and weaknesses in the skills areas.

6. Criterion performance test results should be consistantly reviewed so tha the teacher, as the educational facilitator, can know exactly where pupils under her direction stand in relation to the mastery of all skills needs as diagnosed for each child.

7. A process report for each learning environment should be required of each teacher facilitator three times a year, i.e., November, March and June. This report would define in criterion terms what percentage of their pupils were meeting the criteria set for all elementary levels, including pre-school.

8. The criterion percentage of skills attained for each level would be determined empirically after the system was established. To start, we would expect children to attain 80% criterion level.

9. In conjunction with the above process evaluation system, it will also be necessary to develop an immediate method for organizing process evaluation for each school, so that those learning environments which are not meeting the criteria in any school will receive immediate assistance from the principal, supervisors, helping teachers and other ancillary personnel.

10. In order to facilitate the above recommendations, an extended teacher training program should be organized around the system science concepts: management by objectives, diagnostic-prescriptive teaching, learning centers, skills taxonomies, criterion testing, pupil record keeping relative to skills profiles, materials and media technology, problem solving and mastery learning vs normative learning patterns. (See Bloom, Block, Carroll, Gagen', and Cohen.)

11. To assure an efficient and cost-effective establishment of the above technology, it is recommended that such a program be started with ten (10) schools each year. In order to combat the soothsayers who will attempt to flay this model by saying "it's too much work" or "it cannot be done", we offer the following well organized systems and technology which can be adapted and used

immediately. The work has already been done by other school districts. Why recreate the wheel?

- Wisconsin Design
- Power Reading
- Croft Program
- High Intensity Learning Centers
  Reading - Arithmetic
- Prentice Hall Teacher
  Competency Development System by James Popham and Eva L. Baker
- Curriculum Evaluation
  CSE Monograph Series in Evaluation Center for Study of Evaluation, University of Los Angeles, California
- Educational Testing Center - Princeton

12. In order to solve the reading and learning problems of th s city, the nature and complexity of the reading process must be better understood by the professional staff. At present, the search for the magic reading method, the numbers game, i.e., GE scores and a myopic refusal by large numbers (not all) of teachers and administrators to define the problem, and the urgent need for new learning environments and educational technologies which better fit the needs of the pupil population, continues to delay the reduction of learning and reading failure that we now experience. Without such a "shift in attitude", the problem cannot be solved.

13. There is also a very urgent need for more direct supervision of the teaching-learning process by professional educators and specialists who are not intimidated by confrontation, who will risk, act as change agents and actively search for a solution to the reading and learning problems in the schools, not just go through the motions.

14. If such persons, as suggested above, can be found and persuaded to act as "change facilitators' as well as supervisors, and not just maintainers of the status quo and/or of traditional education techniques, we will then really

begin to find solutions to the problem. It is also imperative that all administrators, from the building principal to the superintendent, organize their support and direction to enhance, as their top priority, all educational process technology, personnel and training in the solving of the educational process learning problems. To do this they must develop and support a professional climate which will assure the successful implementation of a systems approach, using a management by objectives technique, coupled to a taxonomy of basic skills, and to re-educate and train the entire school system in such a technology. This is a formidable undertaking, but it can be done. It requires optimism, energy, knowledge; administrative, teacher p parent and community support; and sufficient leverage when needed, to see that 80 percent of the goals and objectives are attained. When these goals are not attained, we should know why and have the courage to correct whatever variable is interfering in the attainment of these process goals. This will mean that children's interests will come first, everything else is secondary!

APPENDIX A

THE BASIS OF THE TITLE III - 306

Educational Theory, Prescriptive Strategies and Programs

The projects' instructional strategies and educational prescriptions are based on research in the following areas and in the major works of Piaget, Bruner, Hunt Mac V, Hebb, Luria, Vigotsky and Myklebust, et al. These researchers have made several important contributions to knowledge from which we have attempted to develop our procedures and methods. Chief among these assumptions are:

(a) The nervous system develops in a given hierarchy.

(b) Certain senses and combinations of senses are relied upon more heavily than others at different developmental stages.

(c) Integration is the synthesis of elementary sensations which occur repeatedly.

(d) The appearance of complex adaptive functions depend, to a great extent, upon the gradual development of integration between sensory systems (this is a major assumption undergirding the Title III Project).

(e) During the early stages of development, the sensory and motor basis for learning is very important. This system acts as the foundation for the later stages of development of the higher mental functions.

(f) Piaget believes that cognitive growth is dependent upon the continued formation of new, higher order, intercoordinated "sensori-motor" systems.

(g) Piaget also believes that the development of these intercoordinated systems is necessary to the development of intelligence and that <u>any disintegration in intersensory coordination will interfere with the normal development of intelligence.</u>

(h) Hunt states that the individual child's interaction with the environment affects the quality and style of his informational processing.

(i) Bruner describes cognitive growth as the gradual development of representational systems which are useful for dealing with the environment. This development passes through three stages: an action pattern representation; an iconic or imagery system and a symbol or language system.

In order to achieve a learning objective a child must first master certain basic skills and concepts. Many educators assume that such skills have been acquired by the child prior to his entrance into kindergarten or the first grade. This is not necessarily so. The above theory and research completed by the above investigators suggest that most children will learn these prerequisite skills only if they are taught to them in a systematic and sequential fashion. The Title III Educational Prescriptive Strategies and Programs is designed to do just that in a systematic way.

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A Readiness for Learning Curriculum Using a "Systems Approach".

TITLE III - 306 PROGRAM

INFORMATION PROCESSING MODEL

Program Materials List

By Sub-Systems

The following is a list of materials used in conjuction with the Information Processing Model which is used as the basis of a curriculum to develop readiness for learning in children from pre-school through the third grade.

A major and very important concept which undergirds the entire Information Processing Model is that all curriculum interventions, which are diagnostic-prescriptive in nature, are conducted in parallel. The program never deals with only one channel. Nor do we use only one kind of prescriptive material. All five sensory inputs or decoding channels are programmed in parallel. (see attached Model.) All materials are organized in a sequential manner, and the curriculum for each area of the model advances from the simple to the complex. This is accomplished by analyzing the materials and organizing them in a hierarchial process, based on the tasks that the material demands of the pupil and the readiness skills the curriculum is designed to develop. By this educational process, we have been able to get much greater impact from the educational packages and materials that we use than if we used only one training material or package at a time. The materials tend to overlap. In this process, what one author of a particular material has left out, another author has included. In addition, we are also able to get a variety of materials with different formats and sequences which tend to train or teach the pupil the same basic skills without inducing boredom. We use this management concept for all areas of the model.

The major objective and goal of the Information Processing Model is to develop the decoding skills of children, using process model we have been attempting to develop a task oriented curriculum, which will eventually be organized around a series of specific instructional objectives which will assure that every pupil exposed to the diagnostic-prescriptive curriculum designed into the model, will

attain mastery of all the basic skills necessary to process information at a criterion of 80% on those skills necessary to survive in school.

The Informational Processing Model also acts as a management system and as an organized and systematic way of delivering the instructional services to the individual classroom.

Within this analysis-synthesis model we are also able to develop more efficient ways to organize learning environments, by controlling the conditions of learning in terms of time-space variables, better use of support personnel, the development of small group instruction and more efficient use of building space. The Information Processing Model permits the organization of a data base for decision making. A curriculum based on the diagnostic-prescriptive approach using small group instruction for children with similar diagnostic needs. The entire model is based on teaching basic skills which lie just behind the reading process. There is no direct linear relationship between many "readiness for learning skills" and the act of reading; but there is considerable evidence available in the educational literature which suggest that,if a child is sufficiently delayed in developing the major decoding skills necessary for efficient information processing, he will not be an efficient learner or an adequate reader. The entire Informational Processing Model is an attempt to develop a diagnostic-prescriptive curriculum which will enable us to deal with the basic skills needed of children, based on empirical data, developed at the educational process level. Further, the model is a scientific process based on data and systems science, designed to develop the necessary technology to unlock the complexities of early education.

Therefore, the materials which are organized below will not be effectively used individually outside the Informational Processing Model or by using them as educational band aids. The materials are organized to be used within the concept of a "systems approach".

Information Processing Model

Readiness for Learning

A Material List for each Micro System (Sub-System)

Gross Motor Process: Movigenics Curriculum:

Description of Item	Number Needed	Supplier
Large Gym Mats	4	J.L. Hammett Co. 2393 Vaux Hall Rd. Union, N.J. 07083
Walking Rail	6	
Standing Unbreakable Mirrors	4	J.L. Hammett Co.
Harmon Jump Ropes	2	
Harmon Walking Rail	2	
Balance Board 21 x 21"	4	
Bean Bags No. 229	24	Developmental Learning Materials, 7440 Natchez Ave. Miles, Illinois 60648
Medium Sz. Rubber Balls #10	2	
Hand Drum No. 213-K	10	D.L.M.
Jump Ropes	6	J.L. Hammett Co.
Metronome	10	

Basis of the curriculum used in the Movigenics Curriculum is a modified Barsch Curriculum. Order the following volumes.

Achieving Perceptual Motor Efficiency Vol. #1 by Ray H. Barsch	1	Special Child Publications 4535 Union Bay North East Seattle, Washington, D.C. 98105
Enriching Perception and Cognition Techniques for Teachers Vol. #2 by Ray H. Barsch (Must)	1	"
Slow Learner in the Classroom by Newell C. Kephart (Revised)	1	"

Pre-School & Kindergarten Program:

Visual Motor Perceptual Intervention Materials:

Description of Item	Number Needed	Supplier
Room Divider Screens	6	J. L. Hammett Co.
Winter Haven Materials Includes materials for 30 pupils, 1 teacher manual	1 bx.	Winter Haven Loins P.O. Box 111 Winter Haven, Florida
Frostig Program for the Development Visual Perception Includes materials for 30 pupils 1 teacher guide - extra copies for each room.	1 bx.	Follett Publishing Co. 1010 West Washington Blvd. Chicago, Ill. 60607
Frostig Test of Visual Motor Integration	25	Follett Publishing Co.
Continental Press Visual Motor Skills Level #1 Visual Discrimination Level #1 Visual Motor Skills Level #2 Visual Motor Skills Level #2		Continental Press Elizabethtown, Pa. 17022
Developmental Learning Materials		D. L. M.
Job Puzzles (set of 8) #100	5	7440 Natchez Avenue
People Puzzles (Caucasian) #101 (Set of 8)	5	Miles, Illinois 60648
Animal Puzzles (set of 72) #102	5	
Multi-Ethnic Children #188 (set of 8)	5	
People Puzzles (Black) (set of 8) #189	5	

Visual Motor Perceptual Intervention: Development of Fine Motor Skills:

Letter Form Board Complete #1-27155	1	Houghton & Mifflin Co. Pennington-Hopewell Rd. Hopewell, N. J. 08525
Color Cued Control Paper	2 bx. per room	D. L. M. 7440 Natchez Avenue Miles, Illinois 60648
Colored Inch Cubes #110	10 bx.	D. L. M.
Colored Inch Cubes #111 Design (box of 34)	10 bx.	D. L. M.
Colored Inch Cube #112 Designs in Perspective	10 bx.	D. L. M.

Pre-School & Kindergarten Program (Cont'd)

Visual Motor Perceptual Intervention: Development of Fine Motor Skills:

Description of Item	Number Needed	Supplier
Large Parquetry #113 (box of 32 blocks)	5 bx.	D. L. M.
Large Parquetry Designs #114 (box of 22)	5 bx.	D. L. M.
Small Parquetry #115 (set of 67 blocks)	10 bx.	D. L. M.
Small Parquetry Designs #116 (set of 20)	10 bx.	D. L. M.
Pegboards #128	10 bx.	D. L. M.
Pegs (40 of 6 colors) #129	10 bx.	D. L. M.
Pegboards Designs #150 (set of 198)	5 bx.	D. L. M.
Tracing Paper #140 (250 sht.)	2 bx.	D. L. M.
Tracing Paper Design #141 (set of 24)	2 bx.	D. L. M.
Parquetry Paper #142 (pkg. of 10)	5 pkgs.	D. L. M.
Dot to Dot Pattern Sht. #143 (400 shts.)	1	D. L. M.
Same or Different Design Cards (bx. of 74) #212	4	D. L. M.
Picture Lacing Boards #203	6 bx.	D. L. M.
Lacing Boards #133	6 bx.	D. L. M.
Front Views-Body Concept	1 bx.	D. L. M.
Spirit Masters I & II #187	1 bx.	D. L. M.
Form Puzzles #269	6 bx.	D. L. M.
Size & Shape Puzzles #270	6 bx.	D. L. M.
Dimensional Puzzles #271	6 bx.	D. L. M.
Hand Drum #213	1	D. L. M.
Pre-Writing Design #146	3 bx.	D. L. M.

Pre-School & Kindergarten Program (Cont'd)

Visual Motor Perceptual Intervention: Development of Fine Motor Skills:

Description of Item	Number Needed	Supplier
Vinyl Lap & Writing Boards #225	10 per	D. L. M.
Dot to Dot Pattern Sht. #143	1 bx.	D. L. M.

First and Second Grade Program - uses many of the same materials, but with a higher order level of educational process expectation and the criterions of mastery are to be moved to a higher level based on the patterned needs of individual learners or small group of learners with similar diagnostic learning needs. The classroom teacher or para-professional supervise the systematic sequential use of these materials.

First and Second Grade Program

Visual Motor Perceptual Intervention: Development of Fine Motor Skills:

Description of Item	Number Needed	Supplier
Job Puzzles #100 (set of 8)	5	D. L. M.
People Puzzles (Caucasian) #101	5	D. L. M.
Animal Puzzles #102 (set of 72)	5	D. L. M.
Multi-Ethnic Children Puzzles (set of 8) #188	5	D. L. M.
People Puzzles (Black) #189	5	D. L. M.
Farm Puzzles #269	5	D. L. M.

The above puzzle groups should only be ordered for first grade classrooms with slow learners or children in the mainstream who display difficulties with learning. These puzzles are especially designed to develop learning readiness in children who are experiencing developmental delays with the integration of sensory perceptual information vital to classroom adaptation.

First and Second Grade Program

Visual Motor Perceptual Intervention: Development of Fine Motor Skills:

Description of Item	Number Needed	Supplier
The following materials are part of the program for all first grade children.		
Colored Inch Cubes #110	10 bx.	D. L. M.
Colored Inch Cube Design #111	10 bx.	D. L. M.
Colored Inch Cube Designs in Perspective #112	10 bx. (5)	D. L. M.
Small Parquetry Shapes #115		D. L. M.
Small Parquetry Design I #116		D. L. M.
Small Parquetry Design II #179		D. L. M.
Small Parquetry Design III #180		D. L. M.
Parquetry Paper #142		D. L. M.
Pegboards #128		D. L. M.
Pegboard Designs #150 (set of 198)		D. L. M.
Tracing Paper #140		D. L. M.
Tracing Paper Design #141		D. L. M.
Dot to Dot Pattern Sht. #143		D. L. M.
Color Cued Control Paper #108 (500 Shts. per bx)		D. L. M.
Frostig Program for the Development of Visual Perception	1 bx. @ #3710	Follett Publishing Co. 1010 West Washington Blvd. Chicago, Ill.
Frostig Test for Developmental Test of Visual Perception	1 copy per cl. rm. in plastic sht.	Follett Publishing Co.
Advanced Frostig Program		Follett Publishing Co.
Frostig Intermediate Pictures and Patterns		"
Student Book #3635	10	"
Teacher Guide #3636	1	
82-150 Parquetry w/Pattern Cards	5 sets	D. L. M.
82-155 Additional Parquetry Prs.	10	

First and Second Grade Program (Cont'd)

Visual Motor Perceptual Intervention: Development of Fine Motor Skills:

Description of Item	Number Needed	Supplier
Frostig Advanced Pictures and Patterns		Follett Educational Co. 1010 Washington W. Blvd. Chicago, Ill. 60607
Student Book #3640	10	
Teacher Guide #3640	1	
Transparent Acetate Overlays 100 in packages #3153-2532		
Dubnoff Program #1 - Level I 21-110	1 Complete	Teaching Resources Corp. 100 Boylston Street Boston, Mass.
Additional Student Workbooks 21-115	5	"
21-120 Dubnoff Program #1 Level #2	Complete	"
21-125 Additional Student Workbooks	10	"
21-130 Dubnoff Program #1 Level #3	1	"
21-135 Additional Student Workbooks		
Easy Off Special Wax Crayons Easy to wipe off for use with plastic covering on cost effective materials.		Benny & Smith
20-210 Dubnoff School Program #2	1 Complete	Teaching Resources Corp.
20-215 Dubnoff 2 Pattern Cards (set of 160)	4	"
20-217 Colored rubber bands 3 pkgs.	10 pkgs.	"
20-216 Dubnoff 2 Pattern Board		

Pre-School and Kindergarten Programs:

Auditory Perceptual Training Materials:

Description of Item	Number Needed	Supplier
Readiness for Learning Systems:		
Talking with Mike by Dr. Ruth Golden	1 set for five cl. rm.	Spoken Arts Co. 59 Locust Ave. New York, N. Y.
Listen, Mark & Say by Dr. Leo Gotkin		Appleton Century
Trip to the Moon by Dr. Leo Gotkin		Appleton Century Croft 440 Park Ave., South New York, N. Y. 10016
Developmental Learning Materials Auditory Perception Training Systems		
No. 197 Total Program Consisting of 5 areas with 3 different but progressively more difficult levels of learning. Consists of spirit masters and cassettes for each system. There is one box for each area: Auditory Memory Auditory Motor Auditory Figure-Ground Auditory Discrimination Auditory Imagery	1 per ea. five cl. rm.	D. L. M. 7440 Natchez Ave. Miles, Illinois 60648
Reading Readiness Systems:		
Ears		Individualized Instruction P. O. Box 25308 - 1901 Walnut Oklahoma City, Oklahoma 73125
Extra Teacher Manuals Extra Student Responses Sheets for cost effectiveness put student responses sheets in visual plastic face sheets		
Space Talk Extra Teacher Manuals for cost effectiveness put student responses sheets in visual plastic face sheets		Individualized Instruction

First and Second Grade Programs:

Auditory Perceptual Training Materials:

Description of Item	Number Needed	Supplier
First Talking Alphabet		
Level I	1	Scott, Foreman & Co.
Level II	1	1900 E. Lake Avenue
		Glenview, Ill. 60025
Note: Modify materials by putting student responses cards in clear plastic face sheets for cost effectiveness.		
Auditory Reading Lab.		
Level A	1	Educational Progress Corp.
Level I - (Second Gd.)	1	8538 East 41st Street
		Tulsa, Oklahoma 74141
Note: Extra student response books 30 per rm. Modify materials by putting student responses booklets in clear plastic sheets.		
Target Red		
Use lap boards with student responses sheets for cost effectiveness	1	Field Educational Publication
		2400 Hanover Street
		Palo Alto, Calif.
Target Blue		
Use lap boards with student responses sheets for cost effectiveness.	1	"

Pre-School, Kindergarten, First and Second Grade Program:

Language and Cognitive Training Materials:

Distar Language System		
Level I		Science Research Assoc.
Pre-School, Kindergarten &		259 East Erie Street
First Grades	1	Chicago, Ill. 60611
Teacher Kit		
Student Take Homes	30 per rm.	
Level II		
First Grade, Second & Third Grades	1	"
Teacher Kit		
Student Take Homes		

Pre-School, Kindergarten, First and Second Grades Program:

Language and Cognitive Training Materials:

Description of Item	Number Needed	Supplier
Distar Language System Level III Third Grades - Low Fourth Grade Teacher Kit Student Take Homes	 1 1	Science Research Assoc.
Attribute Games Thinking Reasoning Problem Solving Skills		
A Reading System as a Decoding Process Distar Reading System Level I Teacher Kit Student Take Homes Used in pre-school, first and slow second grades		Science Research Assoc.
Distar Reading System Level II Teacher Kit Student Take Homes Used in advanced first and second grades and slow third grade pupils.		Science Research Assoc.

Pre-School, Kindergarten and Second Grade Program:

Language and Cognitive Training Materials:

Description of Item	Number Needed	Supplier
A Reading System as a Decoding Process Distar Reading System Level III Teacher Materials Student Materials Used with advanced second & third grades and slow fourth grade pupils.		Science Research Assoc.

Each classroom is supplied with a series of trade books in order to develop a paperback library of 150 to 250 title for each level starting with kindergarten.

Pre-School, Kindergarten and Second Grade Program:

Special Equipment Required to Make the Entire Program Operative:

Description of Item	Number Needed	Supplier
Cassette Player	1	Obtain own supplier
Playback only, with adaptor built-in. Important factor in cost.		
Blank Cassettes	50	"
1/2 hr. - 15 min. each side	25	"
1 hr. - 30 min. each side	25	"
1 - Listening Center with 10 Jacks outlets	1	"
1 - 12 ft. extension cord	1	"
Individual Headsets one for each pupil to complete listening center.	10	"
Material Center (Important)		Brenner Desk Co. 330 Washington Street Newark, N.J. 07102
Large Metal Storage Cabinet serves as material center for storage of all the visual motor materials and auditory perceptual materials and student response form.	1 per rm.	

APPENDIX B

MODEL FOR HIGH INTENSITY LEARNING SYSTEM - READING

By Dr. S. Alan Cohen

PROJECT TITLE: Cost Effective, Continuous Progress, IPI Reading Curriculum for Grades_____.

CRITICAL EDUCATIONAL NEED: Improve Reading Achievement and Permanently Upgrade Reading Curriculum

BRIEF SUMMARY OF PROJECT: To implement a systems approach to reading instruction. The project will implement a classroom management system which allows one teacher and one aide to operate 150 different reading curriculums per day, 30 at a time, using over 40 different publisher's materials, deploying these materials and the professional staff in the most humane and efficient manner to produce dramatic gains in students' reading achievement. The System makes available to each student 20 times the instructional resources usually found in classrooms, and leads to measurable reading gains at a cost-effective rate far better than any other known curriculum. The System provides an inexpensive subsystem for training and implementation. Unlike most publishers' products, the High Intensity Learning System - Reading (HILS) is a curriculum, not a reading program. Within that behavioral objectives, criterion assessment, IPI curriculum, a student at any level learns whatever the diagnostic system finds he needs. He learns it at his unique level and rate by whatever "method" available on the commercial market works for him.

The project is designed for three years' funding at $50.00 per student the first year, $27.00 per student the second year, $20.00 per student the third year and $16.00 per student every year after. These figures assume 150 students per installation per year, and include permanent monthly modifications, upgrading andupdating of the system without outside consultants after the sixth month.

BRIEF DESCRIPTION OF THE SYSTEM

Appendix A provides a detailed description of the High Intensity Learning System - Reading by presenting excerpts from the Instructional Manager's Guide.

In a nutshell, the High Intensity Learning System is a classroom management system built around six features:

1. Prescriptive - Teacher defines student's unique needs and prescribes activities tc meet those needs.
2. Motivating - Pupil gets immediate feedback to his response.
3. Individualized - A variety of materials are used that are designed specifically to assist the teacher in personalizing content, rate and level for each student.
4. Intensified - Its objective is accountability for student and teacher.
   a. Both know what must be learned.
   b. Both know methods and materials to use.
   c. Both know what must be done to show mastery.
5. Definitive - The system is used in a reading center where High Intensity Learning maximizes the amount of "reading period" time the student spends on appropriate learning activities.
6. An "Open System" - The system is continuously being reviewed and improved. It is not partial to any single program or publisher.

The instructional system is designed to increase actual clock time spent by each pupil per class hour in participating in the prescribed learning activity. Research reports that the average teacher receives only 30 - 40% of the pupil's attention fixed on the learning task per class hour. That same research reports the obvious: the single most important variable that best predicts reading achievement is the actual amount of time the pupil spends learning to read and write. The more time he spends all other factors being equal, the higher will be the achievement.

To get this involvement, High Intensity implements a systems approach to reading instruction which delivers to a single classroom 55 different pieces of published material from about 40 different companies, correlated into a behavioral objectives

catalog and a teaching system that uses a diagnostic test and observation for each behavioral objective. The test or observation generates a specific set of alternative prescriptions in the available resources to teach whatever behavior each child needs to learn. A set of teacher management support materials allows one teacher with one set of resources in one classroom to operate this program for 30 pupils per hour, up to five groups of 30 per day. Each child can learn to read or improve his reading by whatever sequence or set of behaviors he finds most successful.

The program uses self-directing, self-correcting, commercially available materials: no teaching machines, no basal readers or textbooks. All the resources are non-expendable. The pedagogical system insures pupil involvement in two ways: First, it utilizes an intrinsic reward, immediate feedback method that insures pupil success and insures pupil knowledge of success. Second, it uses highly motivating, culturally relevant reading content. Thus, the program maximizes the most efficient use of human and material resources to get maximal cost-effectiveness, and it reduces the depersonalizing effect of grades and other external rewards used in the typical classroom. It eliminates also mass instruction in groups of 30 or more and eliminates so-called "homogenous" groups of seven to ten. It totally individualizes instruction inexpensively and generates measured reading achievement gains 150 to 300% above expectancy in urban disadvantaged populations.

Evaluation Design
for
A Program to Improve
Informational Processing
of

CHILDREN
WITH
LEARNING
DISABILITIES

Board of Education
Office of the Superintendent of Schools
Federal Assistance Programs
Newark, New Jersey
Title III, Section 306
Special Programs and Projects

Project Director:
Robert D. Adams
Newark Board of Education

Evaluator:
Dr. S. Alan Cohen

PRODUCT ASSESSMENT

Diagnostic assessment profiles will be provided for each child. These profiles consist of assessments in each area of development stressed by the program: motor development, perceptual development, and language/cognitive development.

The instruments chosen to analyze each aspect of the program are:

SKILL	TEST
Gross Motor Development	Purdue Perceptual Motor Survey
Perceptual Motor Development	Developmental Test of Visual-Motor Integration
Auditory Perception	Wepman Auditory Discrimination Test
Language/Cognitive Development	Peabody Picture Vocabulary Test Illinois Test of Psycholonguistic Abilities: Auditory Vocal Automatic Subtest Auditory Vocal Association Subtest
Reading Development	Metropolitan Achievement Test
General Intellectual Development	Lorge-Thorndike Intelligence Test Level 1 Form A Non-Verbal Battery

Program Objectives: For each major content area, group performance criteria or terminal objectives are summarized below:

AREA	TERMINAL OBJECTIVE
1. Gross Motor Development	80% of the children will perform adequately on 70% of the items on the Purdue Perceptual Motor Survey
2. Perceptual Motor Development	80% of the children will show prepost test gains on the Developmental Test of Visual-Motor Integration (Berry)
3. Auditory Perception	70% of the children will score 8 errors or less on the Wepman Auditory Discrimination Test

AREA	TERMINAL OBJECTIVE
4. Language/Cognitive Development	80% of the children will show gains in Peabody Picture Vocabulary Test, and Illinois Test of Psycholinguistic Abilities (2 subtests) - (1) Auditory Vocal Automatic and (2) Auditory Vocal Association
5. Reading Development	70% of the children will show pre-post test gains of one year for one year's instruction in reading as measured by the MAT.
6. General Intellectual Development	80% of the children will show positive IQ gains on the Lorge-Thorndike Intelligence Test.

All of these measures were administered to similar populations during the previous year and were judged appropriate for the level children involved. Pretest performance will be measured for all the children in the experimental population to establish baseline data.

Procedure: Individual testing will be administered by a team of professionals comprised of the classroom teacher and a group of experienced teachers with some testing orientation such as the reading teacher, the helping teacher, and the Title I teacher. A school psychologist will supervise the administration of the test. All of the tests mentioned above with the exception of the Development Test of Visual Motor Integration, the Lorge-Thorndike Intelligence Test, and the Metropolitan Achievement Test will be individually administered. The three remaining tests will be administered to groups of ten to fifteen children at a time by the teachers.

Testing will take place at the end of kindergarten (pretest) and at the end of grade one (postest). In the future, using the previous year's post test as the next year's pretest, evaluation will continue at the end of each succeeding year. Control groups will not be selected for a number of reasons:

1. When one is reasonably sure that a new procedure is effective in producing positive educational growth, it is of questionable ethics to deliberately withdraw such a treatment from a specified population of children.

Data Analysis: Scores will be analyzed by analysis of co-variance, the covariate being the pretest score. Pretest scores will be independently analyzed by analysis of variance techniques. Analysis will consider the variable of school, sex, ethnicity and constraint. "Constraints" refer to results of a Likert scale scoring of factors that reduce the effectiveness of a classroom. Each class will be rated twice per year on factors that could interfere with program effectiveness (irritable teacher, poor physical plant, disrupted school year). Hence, a number of three-way analysis of variance will be administered for each variable. Correlations will also be obtained among the variables. In addition, growth scores will be displayed by school, sex, ethnicity and constraint.

Pretest analysis will take place as soon as possible after testing and will be summarized in table form and submitted to the project director in January.

Post test analysis will take place immediately after post testing. These results will be summarized in table form and presented along with an explanatory report to the project director. This report will be completed by the beginning of the following school year.

Sheets providing scores of individual children on all of the measures which can provide teachers with assessment profiles of the children in the class will be provided a month after pretesting so that such information can provide a basis for formative evaluation of the children. Hence, the teachers and project personnel can use the information to provide appropriate remedial assistance. Also the teacher will have access to information to help himchoose learning materials appropriate to the child's level in the various skill areas assessed.

Scores on all variables of the total E group will then be compared by t-test to criterion data from the previous years' sample to determine if significant gains were achieved in the experimental program.

OTHER ASSESSMENTS

The problems of assessing attitudinal factors are well known to both professional educators and lay people who have worked closely with special school programs.

The problem stems from educators' tendencies to avoid operational definitions of their favorite ambiguities ("motivation to learn", "relevancy", "good attitude", etc.). These ambiguous constructs have come to be known among systems specialists who are just beginning to infiltrate the profession as "fuzzies". This evaluation design will assess one class of fuzzies using the P Ratio described below under "Process Assessment".

In addition to P Ratio, the evaluator will provide specific recommendations based on a systems analysis of the classroom - specifically, the analysis of staff, student and materials deployment, physical plant utilization, and cost effective analysis. Part of the systems analysis will include a Discrepancy Analysis (DA). A DA provides an operational definition of specific goals sought compared to the actual operations performed in the classrooms. If possible, the DA will be finished in time for the interim report. The final report will include specific recommendations for program redesign based on this systems analysis.

PROCESS ASSESSMENT

Five different process assessments will be conducted, with consideration given to (1) minimizing the interference of the assessment procedures with program operation (2) maximizing the kinds of data needed to intervene to improve the program as it presently exists (3) maximize the kinds of data needed to redesign the program for the 1973 school year.

1. Schedule Check: An important aspect of the program treatment is intensity, hence the use of a day to day schedule designed to insure that the children receive daily intensive instruction. At 10 different times per school, Project Director staff will perform schedule checks. The observer will observe for one minute, 10 minutes after the start up of the scheduled "experimental treatment" and 10 minutes before finish to see if the schedule is being followed. The one-minute observation is ample time to answer yes/no: Are the students performing a task as indicated by the schedule? Percentage of times on schedule for the total project and by school will be determined.

2. P Ratio: P Ratio is the percentage of clock time students are in fact participating in prescribed learning activities. This classroom observation technique (see Cohen, "The Taxonomy of Instructional Treatments In Reading: Its Uses and Its Implications As A Classroom Analysis Scheme", The Journal of the Reading Specialist, Vol. II, No. I, October, 1974, pp. 5-23) objectively measures how much the learner is "with it" which is an operational aspect of such fuzzies as "an effective teacher" or "a motivated learner", etc. Three different observers will do one P Ratio of each classroom.

3. Systems Analysis: The evaluator will provide a DA report and a systems operation analysis based on three on-site visitations by evaluation staff.

4. Constraint Analysis: Each classroom will be rated twice per year independently by three project director staff members on a 6-point Likert scale representing degree of constraint. A high constraint classroom would be one with an irritable, uncooperating teacher, in a hostile negative school atmosphere in a poor physical plant, not following the schedule, with a low P ratio. A low constraint classroom would, of course, be one that appears to the observers to be operating well. Product data will be analyzed by this process factor.

5. Progress Audit: A ten percent sample per school (about 55 subjects) will be identified using a random selection technique. Twice per year (February and April) a sample will be so selected, and the project psychologist will select one progress chart in either visual motor, auditory or language, and at least one progress chart in the Distar program, select the most recently recorded evidence of mastery, and check that mastery. A tally of the checks should show at least an 80% agreement with the teacher's notation of mastery to conclude that no discrepancy between the audit and the teacher's assessment exists.

MANAGEMENT ASSESSMENT

Evaluation of this program will also include looking at various management practices in terms of the degree to which functions are being carried out by each management component. Three areas will be evaluated: Program Management, Classroom Management, and Parent Involvement.

Program Management will consist of ascertaining by means of records and classroom inspections that necessary supplies and materials are ordered and distributed in time; that adequate training of personnel in model components occurs and that the non-classroom personnel (e.g., psychologists, etc.) are carrying out their functions. Evidence will be gathered through records that are kept of project activities and through teacher and teacher aide interviews.

Parent Involvement will be evaluated through interviews with a sample of parents and the PAC chairman. Records of activities and meeting attendance will be kept. Interviews will deal with attitude toward school and program, opportunity of involvement in school and program activities, degree of decision making involvement, knowledge of program's content and goals.

EVALUATION/AUDIT PLAN SUMMARY CHART I

PERFORMANCE OBJECTIVES	EVALUATION MEASUREMENT TECHNIQUES AND INSTRUMENTS				EVALUATION DATA COLLECTION PROCEDURE			
Classify by Target/Operator Group	General Techniques	Special Conditions	Name/Type Instrument	Date Instrument Available	Baseline Data	Target Group	Scheduled Date(s)	Person Responsible
Gross Motor Development	Pre- Post- Test		*1.	10/72	Pre-Test	E Group	6/72	Project Director
Perceptual Motor Development	Pre- Post- Test		*2.	9/10/72	Pre-Test	E. Group	6/72	Project Director
Auditory Perception	Pre- Post- Test		*3.	9/10/72	Pre-Test	E Group	6/72	Project Director
Language/Cognitive Development	Pre- Post- Test		*4.	9/10/72	Pre-Test	E Group	6/72	Project Director
Language/Cognitive Development	Pre- Post- Test		*5.	9/10/72	Pre-Test	E Group	6/72	Project Director
Language/Cognitive Development	Pre- Post- Test		*6.	9/10/72	Pre-Test	E Group	6/72	Project Director
Reading Development	Post- Test Only		*7.	6/72	Post-Test	E Group	6/72	Project Director
General Intellectual Development	Pre- Post- Test		*8.	9/10/72	Pre-Test	E Group	6/72	Project Director

*1. Purdue Perceptual Motor Survey
2. Developmental Test of Visual Motor Integration
3. Wepman Auditory Discrimination Test
4. Peabody Picture Vocabulary Test
5. Illinois Test of Psycholinguistic Abilities
   Auditory Vocal Automatic
6. Subtest; Auditory Vocal Association Test
7. Metropolitan Achievement Test
8. Lorge-Thorndike Intelligence Test

EVALUATION/AUDIT PLAN SUMMARY CHART II

PERFORMANCE OBJECTIVE	EVALUATION TECHNIQUE AND INSTRUMENTS				DATA COLLECTION PROCEDURES		
Classify	General Technique	Special Conditions	Instrument Name	Baseline Data	Target Group	Schedule	Person Responsible
P Ratio (Process Check)	Classroom Observation Chart	Indicates Pupil Participation or Intensity	P Ratio Analysis Chart	35% is average P Ratio	E	3 per classroom in January	Project Director
Progress Audit (Process Check)	Audit Check to validate teacher assessment of pupil progress	10% sample per school	Re-administer appropriate criterion test	20% max. discrepancy	E	Feb. & Apr.	Project Director
Constraint Measurement (Process Check)	Likert Rating	Inter-observer agreement (3 observations)	Likert Scale	N/A	E	By Mar. 1	Project Director
Schedule Check (Process Check)	Observation	N/A	Observation of middle block of time	Schedule as designed	E	Twice per month	Project Director

APPENDIX D

Other Title III - 306 Products and Reports

- Movigenics Curriculum
- Visual Motor Perceptual Training Handbook - Specific Instructional Objectives Coded To All Materials Used In The Title III - 306 Project
- Evaluation Designs by:
  - Dr. Jack Victor - Kindergarten
  - Dr. S. Alan Cohen - First Grade
  - Dr. James E. Laffey - Second Grade
- Interim and Final Reports by:
  - Dr. Jack Victor - Kindergarten
  - Dr. S. Alan Cohen - First Grade
  - Dr. James E. Laffey - Second Grade
- Educational Accomplishment Auditors Reports for:
  - Kindergarten
  - First Grade

  By King B. Nelson
  The Institute of Development of Educational Auditing
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